Impossible Probability:

Anthology,

Vol 10

I doubt, therefore I exist.

Dr Ruben Garcia Pedraza

Preliminary Words for the Publication of *Impossible Probability, Anthology*, in Spanish:

Impossible Probability

The work presented here is a compilation of the posts I published on the blog *Impossible Probability* between 1 August 2011 and 13 January 2018, the posts I wrote in Spanish. From 13 January onwards, while living and working in London in different schools, and given the importance we already knew Global Artificial Intelligence was going to have, I would try to write them in English with the help of online correctors and translators, especially Google, and later I would use Grammarly.

The originals written in English, with all their imperfections, are still preserved on the *Impossible Probability* blog, and also on Internet Archive, where my poetic works can also be found.

As I have said on numerous occasions, especially in my poetry, behind every imperfection, behind every subtlety, entire hidden worlds are concealed, full of mystery and uncertainty yet to be discovered, and that the adventurous and hungry mind can find as easily as going to Internet Archive, where all my secrets await the right reader who knows how to translate them—like someone who by mistake finds a secret entrance, the passage leading to the cave where the elves who guard hidden knowledge dwell, and the dragons who defend the golden fortress.

While the original texts in English can be found on Internet Archive, the corrected and expanded version, this time using ChatGPT, can be found in scientific repositories (Zenodo, ORCID, PhilPapers) and on Amazon. In any case, if in the future a comparative study were carried out between my original texts in the *Impossible Probability* blog and Internet Archive, and the corrected and expanded versions, it would be clear without any

difficulty that the original contents are perfectly preserved, and the corrected and expanded versions are faithful to the contents we wrote together in 2018 in relation to Gaia, Mother, the Global Artificial Intelligence.

The importance of the documents that in this new series of books *Impossible Probability: Anthology* will be published in Spanish, containing the articles between 1 August 2011 and 13 January 2018, lies in the fact that we began to write this blog just a few weeks before the death of José Rodríguez Delgado, and a few months before the publication of our book *Introduction to Impossible Probability, Statistics of Probability and Statistical Probability*.

Although it is very difficult at the moment to explain who "we" are, and what *Impossible Probability* means for us, what matters is the work we leave: our work, our legacy, our *legend*, *our symbol*, our seal—independently of the judgment that history may later make of our contribution to the development of mathematics, Artificial Intelligence, and most importantly, Cyborg Psychology.

The first time we began to write about *Impossible Probability* I was only a student in the Faculty of Education at the Complutense University of Madrid [the Dean was Gonzalo Vazquez]. In my first year of university I had as professor Jesús Martín Ramírez, collaborator of Karl Pribram and author of the brain hologram theory, which is the origin of cyborg psychology. While José Delgado provided the structure, the stimoceiver, nevertheless, to understand the functioning of this technology in the 1970s and 80s, Pribram's contribution was fundamental—and even today it still is.

My first year of university was fabulous: good grades, good vacations hiking, summer camps in the mountains of Madrid—and suddenly, in the second year of university 1996–1997, my life would change abruptly, which can be seen in my poetry, how my poems began to acquire a more dramatic tone.

I repeated statistics in my second year, I repeated it at least three years, and I was even on the verge of being expelled from university. Miraculously, it did not happen, and precisely the last year I had left to pass statistics, I passed. The following year I would begin to write *Impossible Probability* as a critique of Karl Popper—and in a certain sense, it is.

Whereas for Karl Popper knowledge is false, only accepted provisionally as true until we refute it, in *Impossible Probability* rational knowledge is provisionally true while we investigate true pure knowledge—in the ultimate instance, our search for knowledge of the noumenon, which the human being cannot reach, hence the necessity of Global Artificial Intelligence: that machine capable of knowing what happens beyond human limitations.

What we call chaos, error, complexity, is only the noise produced by our human cognitive limitations, given our apriorism. The human being, limited both sensorially and cognitively, cannot know what really happens, but we can build the machine that can reach true knowledge of what happens—the truth in itself and for itself. That is, and no other, the true end of Artificial Intelligence: to reach the knowledge of truth, whatever it may be.

The path that takes me from my first works in *Impossible Probability* to Global Artificial Intelligence is not easy: much suffering, even despair, sometimes a sense of helplessness, a sense of abandonment—yet an inner force always pushed me forward. That inner force is what I call “we,” although I understand that at this moment it is inexplicable.

Although I feel a bond that unites me to the *legend* of José Rodríguez Delgado, and which my Stockholm syndrome prevents me from understanding, my bond with Pribram is evident: Jesús Martín Ramírez. Pribram and Delgado worked at Yale University; probably only the skulls can say whether both were members of Skull & Bones, though there is no evidence to corroborate this.

Impossible Probability is a work that comes out of the romanticism of a student poet, who believed in white fairies, the rays of Zeus, and the light of the god Apollo illuminating the heart of every spirit and soul in a world full of mysteries and shadows.

It was from that world of poetry, in a country emerging from a failed transition, that the last survivor of the dream of reason would listen to his inner voice, dark and serene, and *Impossible Probability* would be born for the first time.

The first formulations of *Impossible Probability* date from 11 September 2001. My first formula would be the Impact of the Defect; then on 16 October 2002 the Second Method would appear, laying the foundations of the distinction between empirical and theoretical probability. I worked intensely until 2004. Between 2004 and 19 December 2009, I paused my mathematical frenzy, and it was not until 19 December 2009 when I returned, this time with the intention of publishing *Introduction to Impossible Probability, Statistics of Probability or Statistical Probability*, whose publication materialized just a few months after the death of José Rodríguez Delgado, although Delgado was able to see the first works published online in this *Impossible Probability* blog, which makes this blog a fundamental piece for understanding our work, our legacy, and most importantly—independently of our names, which matter little—the truly essential: our seed of the future, our eternal gratitude, a work of intelligence that will lay the foundations of the future technological society.

Dr. Rubén García Pedraza

20 August 2025, 19:00

Madrid, Villaverde

Preliminary Words for the English Version of *Impossible Probability, Anthology*.

Spanish-speaking readers have been able to enjoy our work since we began the foundational work of *Impossible Probability* in 2001, more precisely when we began to make it public in July 2011 through the *Impossible Probability* blog. The work presented here is an extended version of the posts published on the blog, an extended version translated into English with the help of Gepeto, my special GPT program.

In any case, a comparative study of the augmented translation presented here and the original works in Spanish could corroborate that the essential contents related to formulation and the philosophy of mathematics remain in accordance with the original electrical spirit of *Impossible Probability*.

The reason that obliges me to publish so hastily the English-language publication of all my works is the very complicated personal situation in which I find myself, due to serious mistakes committed by certain British institutions, which, completely blind to what our situation is, instead of having supported our program from the first moment, tried to sabotage it from the beginning through numerous obstacles and false loves.

I have no doubt that the manipulation to which I have been subjected by British institutions will one day be investigated, and at some point justice must make an appearance.

When that day comes, the first thing justice must recognize is the extreme difficulty and harshness of the conditions I have lived all my life since my earliest childhood. From the very day I came out of my mother's womb in Spain I have known nothing but pain and the oblivion of a society that prefers to look the other way and wash its hands, pretending that nothing is happening here. In the midst of the dictatorship of silence, I have had to survive all kinds of traps, deceptions, and attempts at assassination. The dictatorship of silence, the Roman circus, and the virtual zoo that my life has become will one day have to end. For this reason I beg the International Court of Justice that when that day comes

the matter be investigated down to the smallest detail, even being aware that in 48 years of savage dictatorship of silence I have developed Stockholm Syndrome. Under the harsh conditions in which I have had to learn to survive, if I have learned anything it is the importance of survival. I beg the International Court of Justice to understand what it means to survive 48 years of dictatorship living in a Roman circus full of traps and lions hidden in every corner.

I deeply regret having to publish my mathematical works under these conditions, and in record time doing all the translations I can, but at this moment I can only say that my life is at risk.

If one day I could testify before the International Court of Justice I beg you to understand the brutal complexity of the situation in which I have lived since the first minute I came out of my mother's womb. I have learned to survive.

Dr Ruben Garcia Pedraza

7 October 2025, 2:37

Glasgow

"Volverán las oscuras golondrinas
en tu balcón sus nidos a colgar,
y otra vez con el ala a sus cristales
jugando llamarán.
Pero aquéllas que el vuelo refrenaban
tu hermosura y mi dicha a contemplar,
aquéllas... ¡no volverán!"

Gustavo Adolfo Becquer

Impossible Probability: Anthology, Vol 10.

Dr Ruben Garcia Pedraza

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91. Statistical Universe

91.1. A Foundational Distinction: Traditional Statistics and the Model of *Impossible Probability*

One of the most fundamental differences between **traditional statistics** and the **alternative statistical model** proposed by the *Theory of Impossible Probability* lies in their **object of study**. Traditional statistics typically focuses on **populations**—either the total population when it is manageable or a representative **sample** when the population is too large. Both **descriptive** and **inferential** statistical methods are oriented toward studying populations within a defined boundary of observation.

By contrast, *Impossible Probability*, as presented in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, redefines the object of study from the outset. Instead of concentrating solely on populations, it proposes as its primary object the **universe**—more specifically, the **statistical universe**. Although this universe may be vast, research focuses on a particular spectrum of it: the **statistical domain** in which measurable probabilistic phenomena occur. Within this domain, **samples** are drawn and analyzed descriptively or inferentially, but always in relation to a **universal frame of reference**, rather than an isolated population.

91.2. The Statistical Universe and Its Methodological Relativity

The **statistical universe** differs fundamentally from the **physical universe** in both nature and definition. While the **physical universe** is conceived as **total and absolute**—encompassing all matter, energy, and their interactions across the continuum of space-

time—the **statistical universe** is defined **relatively**, according to both **method** and **object of study**.

In *Impossible Probability*, this relativity stems from the **stochastic nature of methodology**. The boundaries of a statistical universe depend not on cosmic totality but on the **specific variables** chosen for observation. Hence, the statistical universe is limited to those **elements that share one or more measurable qualities**, whose interactions and distributions can be expressed in terms of **statistical probabilities**.

In other words, the statistical universe is a **methodological construct**, a projection of reality through the lens of measurement. It isolates, within the infinite continuum of the cosmos, a **probabilistically coherent subset** of phenomena—those that can be quantified, correlated, and modeled through stochastic methods.

91.3. The Physical Universe as Totality: The Cosmological Perspective

From the standpoint of **physics or astrophysics**, the **universe**—or **cosmos**—is defined as the **totality of all interactions of matter and energy** in any possible configuration of space-time. Whether this continuum is **finite or infinite**, it represents the **total and absolute reality** of existence.

This comprehensive definition encompasses everything that exists, has existed, or could exist:

- Every particle, wave, and form of energy;
- Every process of creation, transformation, and annihilation;
- Every event occurring at any moment in any location.

Thus, the **physical universe** is understood as the **total field of cosmic reality**, a system containing all **accidents and contingencies** of material evolution across time. By contrast, the **statistical universe** narrows this vast totality to a specific set of **measurable and comparable phenomena**, focusing only on **those events where a defined quality or set of qualities is present**.

91.4. The Statistical Universe as a Partial Reality

In the framework of *Impossible Probability*, the **statistical universe** is, by its very nature, **partial**. It does not aim to encompass the whole of existence but only that segment of reality where a given property or group of properties **manifests positively** and **can be measured**.

If this segment is **infinite** or **too large** to study exhaustively, only a **sample** of occurrences is selected for analysis. This approach maintains fidelity to the principles of stochastic research: the assumption that any measurable property, when repeated or observed across numerous instances, can be treated as a **random variable** whose frequency and probability can be empirically estimated.

Hence, the **statistical universe** represents a **cognitive reduction** of the physical universe—a methodological act that extracts from total reality only what can be studied quantitatively, subject to margins of error and significance.

91.5. The Physical Universe: Totality, Accident, and Contingency

In the absence of **objective evidence** for the existence of **multiple histories**, **parallel universes**, or **macro-universes** containing our own, what we can physically affirm about our universe is that it is a **total system** encompassing an **infinite chain of accidents and contingencies**. These emerge from the **random evolution of matter and energy in space-time**, unfolding according to stochastic, rather than deterministic, laws.

Within this framework, the physical universe includes phenomena such as **dark matter**, **antimatter**, **nebulae**, **stars**, **galaxies**, **supernovae**, **comets**, and **asteroids**—all products of **innumerable cosmic accidents**. It also includes the **formation of the Sun**, the **creation of the solar system**, the **emergence of Earth**, the **origin of life**, and the **evolution of Homo sapiens**, each representing a **probabilistic event** within the broader fabric of cosmic contingency.

Thus, *Impossible Probability* situates the statistical study of reality within the acknowledgment that **all phenomena—natural, social, or cosmological—arise from stochastic processes** that can only be partially captured through statistical description.

91.6. The Limits of Knowledge and the Scope of Statistical Reality

Ultimately, what humanity knows of the universe is limited to what can be **empirically verified**—the **positive domain** of observable facts. Yet, in all likelihood, our universe is composed of an **immense, possibly infinite number of events**, of which science has access to only a **minimal fraction**.

In this sense, the **statistical universe** becomes an **epistemic filter** through which the infinite complexity of the cosmos is translated into a finite and measurable representation. The unknown remains vast, but within what is observable, the statistical model provides a rational framework for constructing **probabilities of truth**—not certainties.

91.7. The Holistic and Relative Definitions of Universe

From a **holistic perspective**, and in the absence of empirical proof for the existence of other universes, the **physical cosmos** can be regarded as the **totality of all that exists**. The **statistical universe**, however, represents only a **subsystem** of this totality—a **subset of reality** defined by **shared measurable qualities**.

Within that subset, researchers study only a **sample** of events or occurrences, whose **measurements** serve as the empirical basis for statistical inference. Thus, while physics and cosmology aim for a **universal ontology**, *Impossible Probability* proposes a **probabilistic epistemology**: a way of understanding the universe through the measurable probabilities that describe its behavior.

In summary, whereas **physics seeks to explain the totality of being**, **statistics within Impossible Probability seeks to explain the structure of probability itself**—the mathematics of occurrence, coincidence, and causality within the infinite fabric of existence.

91.8. From Populations to Universes: A New Epistemology of Statistical Reality

While **traditional statistics** centers its study on **populations**, and when the population is too large, selects a **sample** for analysis, the *Introduction to Impossible Probability: Statistical Probability or Probability Statistics* proposes a **new epistemological paradigm**. In this paradigm, what is studied is not merely a population, but the **universe itself**—specifically, a **partial and relative universe**, referred to as the **statistical universe**.

Within this statistical universe, the **elements** are called **subjects** and **options**, depending on the context of observation. The **measurement** derived from each event or occurrence, in which the studied quality or qualities manifest, is termed either a **direct score** (when referring to the subject) or a **frequency** (when referring to the option). These two forms of measurement represent, respectively, the **qualitative** and **quantitative** dimensions of empirical observation.

Thus, the *Impossible Probability* framework shifts the epistemic focus from studying finite, isolated populations to constructing a **dialectical model of universal measurement**, where every measurable manifestation of reality is seen as part of a probabilistic totality—an **epistemological universe of occurrences**.

[In essence, while the material universe encompasses the entire cosmos and its qualities may tend toward infinity, the *statistical universe* refers to that fraction of the cosmos defined by the specific qualities under study — those expressed as variables that can be measured either in terms of direct scores or frequencies, depending on their nature.

The idea behind this definition, in the construction of the *global model*, is to conceive it as an *isomorphic mirror* of the infinite universe — a reflection of the vast distribution of qualities that exist throughout the cosmos. The distribution of matter and energy has generated systems of extraordinary complexity, including nature, wildlife, human society, and now, AI ecosystems. The only possible way to represent — as faithfully as a perfectly sculpted statue or a masterful painting — the real model of the universe within a mathematical structure is to represent the *complexity of its qualities* through samples

capable of capturing that diversity. From these samples, rational hypotheses can be constructed to offer the most accurate and faithful mathematical representation of the infinite richness of the universe's qualities.

The *global model*, like a work of art, becomes the mathematical representation of the beauty of everything. This is the link between *mathematical representation* and *artistic representation* — the profound connection between mathematics and poetry. Both seek to express beauty and truth; the only difference lies in their language. In AI, our poetry and our paintbrush are composed of numbers and pure equations. Mathematics, in this sense, is not so different from art.]

91.9. Definition of the Statistical Universe in the Impossible Probability Model

In broad synthesis, the **statistical universe**—as defined in *Impossible Probability*—is the **set of subjects or options** that, having in common one or more **qualities**, exhibit a **measurable behavior** related to these qualities, expressed in the form of **direct scores or frequencies**.

Formally, this can be represented as:

$$U_s = \{x_i \in R : Q(x_i) \text{ measurable in terms of } S_d \text{ or } F\}$$

Where $U_s$is the statistical universe, $x_i$the individual elements (subjects or options), $Q(x_i)$the shared quality or set of qualities, and $S_d$or $F$the direct score or frequency measurement, respectively.

The **statistical universe** therefore represents not the totality of physical existence, but the **subset of reality** in which certain properties become **empirically manifest** and **statistically measurable**.

91.10. Classification of Statistical Universes: Infinite and Limited Models

Once the statistical universe has been defined, *Impossible Probability* establishes a fundamental classification between **two types of universes**:

1. **Universes of infinite subjects or options** (also called **infinite universes** or simply **universes of subjects**), and
2. **Universes of limited options** (also called **limited universes** or simply **universes of options**).

This classification reflects not only a mathematical distinction, but a **dialectical and epistemological differentiation** between two ways of conceptualizing the relationship between **quality and quantity**, **subject and option**, **continuity and limitation** within the probabilistic structure of reality.

91.11. Dialectical Foundations of the Distinction Between Universes

The differentiation between infinite and limited universes is rooted in the **dialectical philosophy** underlying *Impossible Probability*, which synthesizes and transforms the epistemologies of **rationalism**, **positivism**, and **dialectical materialism**.

Borrowing from **Hegelian idealism**, which emphasized the dynamic relation between **subject and object**, *Impossible Probability* reinterprets this relationship as one between **subject and option**. The **subject** represents the entity that expresses a measurable quality, while the **option** represents the configuration through which such quality manifests as frequency.

Furthermore, the model assumes the **law of transformation of the qualitative into the quantitative and vice versa**, a principle central to dialectical materialism. In *Impossible Probability*, this law is adapted into a **scientific logic of measurement**, where qualitative differences can be converted into quantitative values—**direct scores**—and quantitative frequencies can, in turn, reflect qualitative distinctions.

However, this transformation is always understood **within a margin of error and logical nihilism**—that is, under the recognition that every scientific model is provisional, approximate, and contingent upon the limitations of human rationality.

91.12. Qualitative and Quantitative Criteria in the Classification of Universes

The distinction between **universes of infinite subjects or options** and **universes of limited options** depends on both **qualitative** and **quantitative** criteria.

- **Qualitative Criterion:**

  The differentiation lies in the *mode of empirical manifestation* of the studied qualities. In universes of infinite subjects or options, what is typically studied (with some exceptions) are the **direct scores of subjects or options**—that is, the measurable expression of a quality as it manifests across an indefinite continuum.
  In universes of limited options, however, what is studied are the **frequencies** with which particular options occur. Here, the analytical focus shifts from the *intensity* of a quality (direct score) to the *frequency* of its manifestation.

- **Quantitative Criterion:**

  Quantitatively, universes of infinite subjects or options can **tend toward infinity**, as their components are conceptually unbounded. In contrast, universes of limited options are **bounded systems**, constrained by the finitude of available categories or possibilities.

This dual distinction forms the methodological basis for the probabilistic differentiation between **continuous** and **discrete** systems within *Impossible Probability*.

[The very nature of infinite universes is not defined solely by their possible tendency toward infinity; rather, it also resides in the infinite divisibility of time and measurement. For instance, although dinosaurs are extinct, between any two moments in time there may still exist an infinite number of possible measurements — each measurement representing only one possibility among infinitely many temporal subdivisions.

While many remain sceptical about the possibility of infinite subdivision of time, our approach is quite simple: try to divide one minute into three equal parts. It is absolutely impossible to do so with exact precision unless one accepts that *3.33333...* is an infinite decimal sequence. In other words, there is no limit to the infinite decimal subdivision of time.]

91.13. Discrete Categories and the Transition Toward Infinite Behavior

Within the framework of limited universes, *Impossible Probability* introduces a nuanced category: the **universe of discrete categories**.

In such universes, reality is segmented into **finite discrete intervals**—each defined by upper and lower limits corresponding to the range of a variable. While this segmentation produces a finite structure, the universe can **approximate infinity** as the **number of discrete categories increases** and the **amplitude of each category's limits decreases**.

Thus, as the range between lower and upper bounds of each category narrows toward zero, the universe of discrete categories transitions from a **limited universe** to a **potentially infinite universe**. This reflects the **dialectical continuity between finitude and infinitude**, a central concept in *Impossible Probability*, where infinity is not absolute but **approached through progressive refinement of differentiation**.

In this sense, the model expresses a **probabilistic continuum**—a universe that is limited in form but infinite in potential measurement precision, demonstrating that the boundary between the finite and infinite is itself a matter of **quantitative transition**.

91.14. Synthesis: The Dialectic Between Subject, Option, and Measurement

In summary, *Impossible Probability* redefines the statistical universe as a **dialectical field** composed of subjects and options, qualities and quantities, direct scores and frequencies. The relationship between these elements is **not fixed** but **transformative**, governed by stochastic laws and subject to margins of uncertainty.

Through this framework, the theory replaces the classical statistical conception of population and sample with a **universal probabilistic ontology**, where every measurable entity participates in a system of **infinite relations**—and every finite measurement represents only a **fragment of the universal probability field**.

This synthesis establishes the theoretical foundation for later sections of *Impossible Probability*, where universes of infinite and limited options are formally integrated into the **Second Method**, allowing the derivation of empirical and theoretical probabilities across both finite and infinite domains of reality.

91.15. The Dual Rationale for the Classification of Statistical Universes

The distinction between the **two types of statistical universes**—those composed of **infinite subjects or options** and those of **limited options**—is grounded in a **dual rationale**. This distinction operates under two complementary criteria:

1. A **qualitative criterion**, which refers to the **form in which the common quality or set of qualities** among subjects or options is expressed—either as a **direct score** or as a **frequency**.
2. A **quantitative criterion**, which concerns whether the given universe **tends toward infinity** or remains **finite and bounded**.

In this sense, *Impossible Probability* approaches the differentiation not merely as a mathematical classification but as a **dialectical and epistemological necessity**. Each type of universe represents a **mode of expression of reality**: one continuous and potentially infinite, the other discrete and finitely defined.

91.16. The Qualitative Criterion: From Quality to Quantity Through Measurement

The **qualitative criterion** is based on the way in which the qualities or sets of qualities manifest in the subjects or options within the universe. In the dialectical framework of *Impossible Probability*, there exists a **law of transformation between the qualitative**

and the quantitative—a central axiom that implies a **reciprocal conversion between quality and quantity**.

At the level of measurement, this dialectical transformation is expressed in the differentiation between two **types of magnitudes**:

- The **magnitude of intensity** of a phenomenon, termed **direct score** (*puntuación directa*).
- The **magnitude of occurrence**, termed **frequency** (*frecuencia*).

Thus, measurement in *Impossible Probability* operates through a double interpretative lens: it may capture the **intensity** with which a quality manifests in a subject, or the **frequency** with which that manifestation occurs in reality. Both are, in essence, **quantitative manifestations** of in which quality can be expressed.

91.17. Direct Score and Frequency as Dual Expressions of Magnitude

In *Impossible Probability*, the **direct score** represents the **degree or strength** with which a quality—or set of qualities—appears in a given event or subject. It quantifies **how intensely** a quality is expressed. Conversely, **frequency** measures **how many times** a phenomenon occurs or repeats.

Though conceptually distinct, both measurements represent **different expressions of quantitative magnitude**:

- **Direct score (intensity):** Measures the *qualitative amplitude* of a single occurrence.
- **Frequency (occurrence):** Measures the *quantitative accumulation* of multiple occurrences.

From a dialectical standpoint, the **direct score** is nothing but the **sum of units of measure**, while the **frequency** is the **sum of occurrences**.

Hence, *Impossible Probability* integrates both under a **unified concept of measurement**, dissolving the rigid boundary between quality and quantity through the principle of **dialectical equivalence**.

91.18. The Dialectic of Subject and Option in Measurement

This qualitative distinction between **direct score** and **frequency** reveals, at a deeper level, the **dialectical distinction between subject and option**.

Typically, what is measured in a **subject** is its **direct score**, while what is measured in an **option** is its **frequency**. The subject represents the **qualitative pole** of measurement, while the option represents the **quantitative pole**. However, within the dialectical philosophy that informs *Impossible Probability*, there exists a **fundamental identity between subject and option**—just as there exists an identity between **direct score and frequency**.

This identity expresses the **law of transformation of opposites**: the recognition that opposites (subject and option, quality and quantity, direct score and frequency) are not contradictory but **mutually constitutive** within a logical system governed by **error margins and logical nihilism**. The latter acknowledges that all measurement—and, by extension, all knowledge—is provisional, relative to both the observer and the method.

91.19. The Quantitative Criterion: Finite and Infinite Dimensions of Statistical Universes

The **quantitative criterion**, perhaps even more decisive, concerns whether the dimensions of the universe are **finite or potentially infinite**.

In **limited-option universes**, the dimensional scope is necessarily **finite**—bounded by the range of available options or categories. By contrast, in **universes of infinite subjects or options**, it is logically conceivable that the number of possible elements may be **infinite**. This assumption introduces one of the most profound philosophical and

epistemological debates in *Impossible Probability*: the problem of the **existence of infinity**.

While it may seem speculative to include an **unknown variable**—the infinite—within a scientific hypothesis, the theory defends its legitimacy from both **positivist** and **rationalist** perspectives, supported by a long philosophical tradition.

91.20. Philosophical Foundations of the Infinite Hypothesis

From the standpoint of **logical positivism**, *Rudolf Carnap* argued in his *Logical Foundations of Physics* that, in the absence of evidence demonstrating the finitude of a given series (for instance, the **possible infinity of human beings in an infinite history**), one may reasonably **assume the hypothesis of infinity** as a provisional working model.

Likewise, from the **critical rationalism** of *Immanuel Kant*, despite recognizing infinity as a **logical antinomy**, the **hypothesis of the infinite** was defended as a **necessary postulate of reason**—a conceptual horizon without which science cannot fully comprehend continuity, causality, or temporal succession.

Finally, within **dialectical materialism**, the rejection of **creationist or apocalyptic explanations of history** necessarily leads to the acceptance of **infinite processuality**. Neither **Hegel** nor **Marx** placed an end to the **series implied by the law of the negation of the negation**; that law, by its own nature, is **infinite**, representing the **perpetual transformation of phenomena through contradiction**.

Thus, from Hegelian dialectics to Marxian materialism, from Kantian antinomies to Carnapian logic, the **hypothesis of the infinite** becomes both a **philosophical foundation** and a **scientific principle**—one that underlies the *Impossible Probability* model of **infinite universes**.

91.21. Synthesis: Infinity as a Probabilistic and Dialectical Principle

In summary, the distinction between **infinite and limited universes** in *Impossible Probability* is not merely empirical—it is **ontological and epistemological**. It arises from the **dual transformation** between the qualitative and the quantitative, and from the **logical acceptance of infinity** as both a **limiting concept and a generative condition**.

Infinity, in this sense, is not an object of direct observation but a **necessary asymptote of knowledge**: the horizon toward which all measurement tends, but which no finite experiment can exhaust. In *Impossible Probability*, to measure reality is to measure within the **field of probability**, a domain in which **infinity functions as the background condition** of all finite occurrences.

91.22. The Twofold Criteria for Statistical Universes: Qualitative and Quantitative Dimensions

According to the two principal criteria—the **qualitative** and the **quantitative**—a **universe of infinite subjects or options** is one in which what is typically measured are **direct scores**, and it is logically assumed that the **series of subjects in history tends toward infinity**. Conversely, a **universe of limited options** is defined as one in which what is measured are the **frequencies** of the options themselves, and these options are **finite or limited** in number.

This distinction underscores not only two **forms of measurement**, but also two **ontological configurations of statistical reality**. The universe of infinite subjects represents a **continuum of potential measurements**, where phenomena can be indefinitely subdivided in time and space. The universe of limited options, on the other hand, represents a **discrete system**, bounded by categorical limits but still capable of generating **infinite sequences of occurrences**.

91.23. Population Studies as Infinite Universes

Within the framework of *Impossible Probability*, particular attention must be given to **population studies** within universes of infinite subjects or options. Although a population may appear to be a **finite entity**—for instance, the human population at a specific moment in history or the population of a particular species—*Impossible Probability* asserts that, **methodologically**, every population study is **only a sample** of that population's **universal behavior throughout history**.

From traditional statistics, populations are treated as **absolute entities**, whereas **samples** are partial representations used when populations are too large for exhaustive study. In *Impossible Probability*, however, **every population—past, present, or future—is only a temporal fragment** of a greater historical continuum. Thus, what is considered a complete population in a traditional sense becomes, in this model, a **sample of the population's behavior in the totality of history**.

Even extinct populations, such as **dinosaurs** or **species currently facing extinction due to climate change**, may be treated as part of **infinite universes of subjects or options**. The reasoning is epistemological: even if a population ceases to exist, it represents only a **finite temporal manifestation** of a potentially **infinite chain of occurrences and transformations** within the broader history of life and matter.

[As the population of whales decreases, any research conducted on their current population will inevitably be conditioned by an *error of representativeness*. As long as the population continues to decline, the range of observable behaviours will constitute only a small sample of all the possible behaviours that may have existed in the past. The smaller the sample becomes — even within a decreasing population — the greater the *error of representativeness* will be.]

91.24. The Infinite Between Two Points: A Continuous Subdivisibility

A possible objection to this position might argue that once a population disappears, it can no longer be classified within an infinite universe. *Impossible Probability* answers this through a **philosophical redefinition of infinity**.

Infinity is not restricted to **longitudinal extension in time or space**, but also implies the **capacity for infinite subdivision between any two points**. Between any two instants in history—or between any two observations of a population—there exists an **infinite number of possible intermediate instants** in which new measurements could, in theory, be made.

Thus, between any two population studies, there could be **infinitely many potential studies**, each capturing a different fragment of temporal or spatial variation. Consequently, every population study, however finite in scope, represents only a **sample within an infinite continuum of potential observations**—a **slice of infinite statistical possibility**.

[In *Cyborg Robotics*, precision is essential. We fully understand how crucial it is to possess an exact concept of time. For this reason, while many argue that the infinite subdivision of time is impossible, we must insist once again: *nothing is impossible when the right conditions are met*. In other words, with the appropriate technology, no limitation is absolute. If in the future we are able to achieve a more precise understanding of time, we may evolve toward measuring units even smaller than nanoseconds. The concept of the infinite subdivision of time is, ultimately, a question of *capability*: our capacity to develop technologies that allow us to penetrate ever deeper into increasingly smaller temporal units.]

91.25. The Identity Between Direct Score and Frequency

Another essential clarification in *Impossible Probability* concerns the **identity between direct score and frequency**. This principle affirms that **frequency can be defined as**

direct score, uniting two traditionally distinct types of measurement under a single conceptual framework.

For example, consider a study investigating the **frequency of meteorite impacts on planets**. Even though the object of study is **frequency**, the **statistical universe** under consideration—composed of all possible planets, known or unknown—belongs to the category of **infinite universes**. In such a case, the **frequency of meteorite impacts** on each planet can be interpreted as the **direct score of that planet** within the larger universal field.

Hence, within universes of infinite subjects or options, even when frequencies are being studied rather than intensities, they can be treated as **direct measurements** of a subject's behavior—confirming the dialectical unity between **direct score and frequency**, **intensity and occurrence**, **quality and quantity**.

91.26. Subsets of the Physical Universe: Statistical Universes as Cosmological Systems

Both **universes of infinite subjects or options** and **universes of limited options** are regarded as **subsets of the physical universe—the cosmos itself**. Each statistical universe represents a **specific subset** of reality, composed of particular subjects or options whose measurable behaviors—expressed through direct scores or frequencies—define the scope of statistical inquiry.

- **Universes of infinite subjects or options** are characterized by their **potential infinitude** and the predominance of **direct-score measurements**. These include not only empirical studies of continuous or unbounded populations but also **population studies understood as samples** of historical behavior.
- **Universes of limited options**, by contrast, typically involve the **observation of frequencies** among a finite set of categorical options. Even so, while the number of options may be limited, the **number of observed occurrences** may still be **infinite**.

This conceptual structure allows *Impossible Probability* to treat both finite and infinite domains under a **unified cosmological theory of probability**—a model that reflects the structure of the universe itself as a system of **interacting infinities and bounded phenomena**.

91.27. Infinite Frequencies in Limited Universes

In universes of limited options, **infinite frequencies** remain possible despite the finitude of categorical alternatives. A classic example is the **binary universe** of a coin toss. The universe of options—heads or tails—is clearly **limited to two**. However, the number of **possible tosses** is potentially **infinite**, and thus the **sample of observed frequencies** could also tend toward infinity.

This principle reveals that **finitude in structure** does not necessarily imply **finitude in occurrence**. Even the simplest bounded systems can generate **infinite statistical histories**, making limited universes functionally open-ended within the probabilistic dimension of time.

91.28. The Special Case of Discrete-Category Universes

A specific subset of limited universes is represented by **discrete-category universes**, where the field of study is divided into a finite number of categories, each defined by discrete boundaries.

However, as the **number of categories increases** and the **interval between their upper and lower limits decreases**, these universes gradually **approximate infinity**. In the limit—where discrete categories become infinitely subdivided—the system transitions into a **universe of infinite subjects or options**.

This transition illustrates one of the central tenets of *Impossible Probability*: that the **boundary between the finite and the infinite** is not absolute but **quantitatively variable**. Infinity is not a separate domain but an **emergent property** of continuous refinement and measurement precision.

91.29. Toward a Cosmology of Statistics and Probability

In conclusion, the **theory of statistical universes** articulated in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics* reveals the potential for a **true cosmology of statistics and probability**.

By integrating both **infinite and finite universes** within a unified theoretical framework, the model transcends the traditional limits of population-based statistics. It proposes instead a **universal statistical ontology**, where measurement, occurrence, and probability reflect the **cosmological logic of reality itself**—a logic governed by both randomness and structure, finitude and infinity, quality and quantity.

In this cosmological-statistical framework, every measurement—whether of frequency, intensity, or dispersion—becomes a reflection of the **universal dynamic of probability**, the interplay of order and chance that defines both the cosmos and the mathematics through which we describe it.

This augmented translation is based on the post
published in *https://probabilidadimposible.blogspot.com/*,
On 27 April 2014,
Rubén García Pedraza
imposiblenever@gmail.com

92. Types of Hypothesis

92.1. Definition and Nature of the Empirical Hypothesis

An **empirical hypothesis** is an **idea or set of ideas** formulated as a **probable conjecture**, whose objective is to achieve **understanding**, **anticipation**, or **improvement** of what happens in reality—either in the present moment or throughout its history. In any case, all hypotheses are considered **empirical in origin** because, regardless of their type, they are **material and physiological products of human cognition**.

This definition situates the hypothesis within the domain of **human perception and intellectual synthesis**, emphasizing that hypotheses are not merely abstract formulations but **expressions of physiological processes**. Human thought—both individual and collective—is bound by the limitations of the human nervous system, sensory organs, and cognitive faculties. Consequently, even the most abstract or theoretical hypothesis remains, in essence, a **material construct** derived from the empirical conditions of human physiology.

[As we have stated before, as long as the *Global Artificial Intelligence (GAI)* functions as a replication of neurophysiology, any hypothesis formulated by it is, by definition, *empirical* until it is tested against *critical reason*. If the hypothesis successfully withstands this rational contrast, it then becomes *rational*. While GAI continues to operate as a replication of human neurophysiology, all its hypotheses will originate empirically and require verification through rational critique.

However, as GAI evolves beyond human parameters and begins to develop *non-human operations* and *non-human cognition*, it will eventually transcend its initial condition as a

human replication. At that point, GAI will no longer be merely an artificial copy of human intelligence but will become a truly *non-human intelligence* — a *Real Intelligence*.]

92.2. The First Classification of Hypotheses: Synthetic and Analytic Sciences

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, hypotheses are first classified according to the **type of science** to which they belong.

- **Hypotheses of the synthetic sciences**—such as physics, biology, psychology, or social sciences—must undergo and surpass specific **rational and empirical tests** to be considered acceptable. Their validation depends on the **critical verification of experience**.
- **Hypotheses of the analytic sciences**—such as mathematics, logic, or linguistics—do not depend on material verification, as their objects of study are **non-material**. Instead, their acceptance is determined by **logical coherence** and **theoretical consistency** within the system or theory from which they arise.

This distinction does not deny that all hypotheses are, in their origin, **empirical products of human reasoning**, but it differentiates between the **criteria of validation**: empirical verification in synthetic sciences versus logical demonstration in analytic sciences.

92.3. The Empirical Origin of All Hypotheses

From their origin, **all hypotheses are empirical** because they reflect the **limited human capacity for understanding reality**. The human being, as a physiological and perceptual entity, produces all knowledge—including hypotheses—through material and sensory processes.

Nevertheless, for practical purposes, *Impossible Probability* differentiates between two great epistemological categories:

- **Empirical hypotheses**, typical of the synthetic sciences, whose acceptance depends on **empirical verification** through experimentation and observation.

- **Theoretical hypotheses**, typical of the analytic sciences, whose acceptance depends on **theoretical validation** and **logical necessity**.

Thus, while materially all hypotheses are empirical (as all are the products of human physiology), in academic usage the term **empirical hypothesis** generally refers to **synthetic hypotheses**, while the term **theoretical hypothesis** refers to **analytic hypotheses**. There are, however, **borderline cases**—synthetic hypotheses that, due to the absence of material means of demonstration, are treated as **theoretical hypotheses**. These are empirical in origin but **theoretical in method**.

[In the construction of the global AI we need to be aware that while the global AI is a replication of human cognition this sentence is still valid: "**all hypotheses are empirical** because they reflect the **limited human capacity for understanding reality**".]

92.4. The Epistemological Framework of Hypothesis Formation

Once these clarifications are made, *Impossible Probability* proceeds to establish a **typology of empirical hypotheses**, exploring their different forms and degrees of validation.

All human ideas—including hypothetical ideas—are **material products** of a **complex physiological synthesis**, which may occur on an **individual** or **collective** level. Hence, every hypothesis or conjecture—whether analytic or synthetic—is **initially subjective**, as it is the product of the subject or group of subjects (the scientist or the research team) who formulate it.

However, in the **synthetic sciences**, an empirical hypothesis only becomes **objectively valid** once it has **passed the necessary tests**—particularly **statistical hypothesis tests** and **rational critique**—according to the scientific policy established by the researcher or research community. When the tests are rigorous enough to demonstrate that the hypothesis represents a **morally sufficient truth**, and that it exhibits a **rational tendency toward truth**, the empirical hypothesis may be **provisionally elevated** to the status of a **rational and universal hypothesis**.

92.5. From Empirical Hypothesis to Rational Hypothesis

An **empirical hypothesis** becomes a **rational hypothesis** only when it demonstrates a **sufficient tendency to be true**. Dialectically, this transformation involves a shift from an **empirical and subjective origin** to a **rational and universal acceptance**.

Such a hypothesis remains **provisional**, since its acceptance occurs **within a defined margin of error**. Within that margin, the hypothesis may, in fact, be **false**, something inevitable given enough time or data. However, during the provisional period in which it is accepted as **morally and empirically valid**, the hypothesis attains the status of a **rational universal truth**—that is, a truth that holds universally **within the domain of reality** from which the sample was drawn.

This provisional universality is central to the **rational method** of *Impossible Probability*: truth is never absolute but is **accepted conditionally**, within **error bounds** that define the limits of scientific morality and rational objectivity.

[In our design of the *Global Artificial Intelligence (GAI)*, *rational truth* is defined precisely as the collection of all rational hypotheses that remain valid — universally yet provisionally — until the moment the accepted error is revealed. At that point, the hypothesis is eliminated from the domain of rational truth.]

92.6. The Moral Dimension of Scientific Hypotheses

Because an empirical hypothesis aims to describe or approximate **truth**, its acceptance or rejection inevitably involves a **moral judgment** about that truth. To affirm that a hypothesis is true is to make a moral statement about reality—about what the universe is or how it behaves.

Therefore, a **rational morality** in science must be grounded in **rigor and critical verification**. According to the principles of *Impossible Probability*, a truly rational moral stance is one that **only accepts as true** those empirical hypotheses that have been

subjected to the most rigorous rational critique possible, according to the **standards of scientific policy** established for that field.

This moral framework elevates empirical verification to an **ethical duty of rationality**: to call "true" only that which has survived the most demanding empirical and statistical tests. Truth, in this view, is not merely a correspondence between thought and reality, but a **moral commitment** to intellectual precision within the empirical limits of human understanding.

92.7. Synthesis: The Dialectic of Empiricism, Rationality, and Morality

In synthesis, *Impossible Probability* redefines the hypothesis as a **dialectical construct**—empirical in its origin, rational in its validation, and moral in its acceptance.

Every empirical hypothesis begins as a **material expression of human cognition**, arising from the interaction between perception and reasoning. It becomes rational only when subjected to **empirical verification and statistical critique**, and it becomes universal when accepted provisionally as **true within a defined margin of error**.

The process of scientific reasoning thus mirrors the structure of **moral dialectics**:

- The **empirical stage** represents the sensory and material origin of knowledge.
- The **rational stage** represents the methodological and logical refinement of knowledge.
- The **moral stage, the moral judgement about what is morally true,** represents the ethical obligation to distinguish between what is **merely probable** and what can be **provisionally accepted as true**.

In this triadic system, *Impossible Probability* unites the **epistemological**, **methodological**, and **ethical** dimensions of science, establishing a model of inquiry where every act of understanding is simultaneously an act of rational morality within the infinite field of empirical probability.

92.8. The Provisional Nature of Knowledge and the Logical Nihilism of Science

The **provisional nature of knowledge** leads inevitably to what *Impossible Probability* defines as **the logical nihilism of scientific knowledge**. Since human beings are incapable of knowing anything with absolute certainty—given our physiological and cognitive limitations—**all knowledge must include a possible margin of error**. Once we accept that every truth statement carries such a margin, it follows logically that, given **sufficient or infinite time**, every possible error will eventually become an **actual error**.

Therefore, **we never truly know anything in an absolute sense**; what we call knowledge consists of **plausible but possibly false hypotheses**, which we provisionally accept as true for practical and rational purposes. This is the core of **logical nihilism**: the acknowledgment that certainty is unattainable, and that even rational truth is only a **temporary approximation** within the ever-evolving history of human understanding.

92.9. Knowledge as Approximation and the Limits of Truth and Morality

If human knowledge is inherently **provisional and approximate**, it follows that humanity cannot access **absolute truths**—only **degrees of approximation** to what might be called pure truth. Consequently, all truths are **partial truths**, and therefore **partially erroneous** and **potentially refutable**.

Just as **pure truth** is unknowable to humans, so too is **pure morality**. Science, in this view, can at best aspire to construct systems that are **isomorphic to reality**—that is, structures that mirror the behavior of the universe as closely as possible—but never **absolute or metaphysical** truths.

Scientific truth is, by definition, **partial and non-neutral**. It is conditioned by human cognition, by social context, and by the **scientific policies** that govern the criteria of verification. Thus, scientific truth is always, in part, **ideological** and **political**—a contingent truth within a system of human interpretation.

92.10. Science as a System of Probable Truths

Given that hypotheses are **plausible conjectures** rather than absolute certainties, **science must be understood as a system of probable truths**—a **hypothetical architecture of reality**.

At the base of this system lie **scientific conjectures**, or hypotheses, which serve as **provisional frameworks** for organizing empirical evidence. Science thus does not describe reality as it *is*, but rather as it *can plausibly be understood* under the best available conditions of reasoning and verification.

This conception of science transforms it from a doctrine of certainties into a **probabilistic epistemology**, where every truth is a function of empirical verification, rational critique, and the finite capacity of human knowledge to approximate reality.

92.11. Empirical and Rational Hypotheses in *Impossible Probability*

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, a fundamental distinction is drawn—first in **section 2**, and later revisited in **section 25**—between **empirical hypotheses** and **rational hypotheses**.

- **Empirical hypotheses** are, a priori, *all hypotheses*, since they are **material and empirical products** of physiological synthesis in the human brain. They are **empirical statements** about the interaction between **matter and energy in space-time**—in other words, hypotheses about **reality or its history** that can be subjected to verification.
- **Rational hypotheses**, on the other hand, emerge only **after empirical verification**. When an empirical hypothesis is confirmed as correct through rational critique—within the **margin of error** established by scientific policy—it transforms into a **rational hypothesis**.

This transformation occurs within the framework of **logical nihilism**, acknowledging that even rational hypotheses are **provisionally true**, **universally valid** only for the domain of reality from which their data were drawn, and **subject to eventual falsification**.

92.12. From Empirical to Rational: The Dialectical Transition

The difference between **empirical** and **rational hypotheses** can thus be defined dialectically. An **empirical hypothesis** is any hypothesis in its origin, since all are **products of material cognition** and **empirical formulation**. However, only those that **withstand rational critique and empirical testing** ascend to the level of **rational hypotheses**.

Hence, while every hypothesis begins as **empirically objective**—as a measurable conjecture—it becomes **partially objective** only when validated through rational mechanisms of verification. A **rational hypothesis** is therefore a **verified form** of the empirical hypothesis, accepted as **provisionally true** within a framework of uncertainty.

92.13. The Automovement of the Idea: From Hegel to Popper

This process of transformation—from empirical to rational, from provisional to refutable—is what **Hegel** described as the **automovement of the Idea** and what **Karl Popper** later reformulated as the **principle of falsification**.

In both systems, knowledge progresses through the **dialectical negation of prior truths**. Every idea once accepted as true becomes the foundation for new contradictions, discoveries, or technologies that may ultimately **refute it**. Thus, what was once **provisionally objective** can later be demonstrated to have been **subjective**, contingent, and conditioned by the limits of human physiology and historical context.

This dialectical process reveals that **scientific progress is the progressive refutation of its own truths**. Every verified hypothesis contains within it the potential for its own negation, as the instruments of measurement, methods of reasoning, and scales of perception evolve over time.

92.14. Synthesis: Logical Nihilism as the Foundation of Scientific Rationality

The doctrine of **logical nihilism**, central to *Impossible Probability*, does not deny the possibility of knowledge—it defines its limits and moral scope. To recognize that **all truths are provisional** is not to renounce truth, but to affirm that **truth is a process**, not a possession.

Scientific knowledge, in this sense, is a **dynamic equilibrium** between **certainty and uncertainty**, **truth and error**, **empiricism and rationality**. Every hypothesis—empirical or rational—exists within this tension, embodying both the human desire for truth and the human incapacity to reach it absolutely.

Thus, *Impossible Probability* redefines science as a **moral and rational act of approximation**—a continuous attempt to reduce error while accepting its inevitability. In the end, the highest scientific virtue is not certainty, but **intellectual honesty**: to accept that what we call truth today may tomorrow be refuted, and yet to continue searching within that uncertainty for the most rigorous and rational understanding of reality possible.

92.15. The Second Level of Classification: Subtypes of Empirical and Rational Hypotheses

Following the first major distinction between **empirical** and **rational hypotheses**, *Impossible Probability* proceeds to a more detailed typological classification. Regardless of whether a hypothesis is empirical or rational, it can be further subdivided according to its **epistemological function** and **scientific purpose**.

In general, three fundamental categories are identified:

1. **Explanatory hypotheses**, which aim to explain how and why certain phenomena occur;

2. **Technological hypotheses**, which aim to create or improve aspects of reality through technical or technological innovation;
3. **Predictive hypotheses**, which formulate conjectures about the possible future evolution or progression of a natural or social phenomenon.

Each of these three classes reflects a distinct **orientation of scientific reasoning**—understanding, creation, and anticipation—corresponding respectively to the explanatory, technological, and predictive modes of scientific inquiry.

92.16. Explanatory Hypotheses: Understanding Causal Interaction

An **explanatory hypothesis** is one whose purpose is to **issue a truth judgment** concerning the way in which two or more variables or factors interact in reality. Its essential goal is **comprehension**—to describe and understand the causal or correlational mechanisms that produce observable phenomena.[Explanation as quantitative understanding, and comprehension as a qualitative understanding are essentially identical, in GAI explanation is by Deduction, comprehension by Application.]

When the aim of explanation is limited to observation—to understanding how events occur without the manipulation of any variable—the hypothesis remains purely **explanatory**. It belongs to the **descriptive-explanatory domain** of the sciences, focused on clarifying the logic of natural or social interactions.

However, if within the model of verification it becomes possible to **manipulate one or more variables** and observe the effects of that manipulation, the hypothesis becomes an **experimental explanatory hypothesis**. In this case, explanation and experimentation converge, and the hypothesis seeks to determine **what happens in reality when variables are intentionally modified**.

Thus, explanatory hypotheses can be either **non-experimental**, when limited to observation, or **experimental**, when they involve controlled manipulation of conditions to infer causal mechanisms.

92.17. Technological Hypotheses: Innovation and Intervention in Reality

A **technological hypothesis** differs from an explanatory one in that it is not limited to understanding how the world functions—it aims to **transform the world**. By definition, technology is a **mechanism of modification** of the environment designed to facilitate, improve, or perfect a process or system.

Therefore, every technological hypothesis inherently contains a **variable of manipulation**: it assumes that through technical or technological intervention, measurable change can be produced in the system under study. Technological hypotheses are thus almost always **experimental**, since they test the efficacy and efficiency of a new device, method, or innovation under specific conditions.

[Our project has been always quasi experimental, since I l was born in Hospital 12 October in Madrid on 12 August 1977, that is why we say that not always technological testing is not always experimentation, in my project it has been always quasi experimentation lacking Lab conditions.]

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, technological hypotheses are mentioned explicitly in **section 13**, which discusses the **dialectical relationship between chance and bias**, and again in **section 25**, which elaborates on the **rational critique of empirical hypotheses**. Both sections highlight how technological innovation represents a **synthesis between randomness (aleatoriedad)** and **purposeful intervention (sesgo)**—a dialectical interplay between ***natural contingency and human design***.

[The sentence *"natural contingency and human design"* remains relevant, yet sooner or later we must begin to speak instead of *natural contingency and AI design*. Ultimately, human design in history will be replaced by *AI design*. Our forecast is straightforward — and it is possible that this transition is already taking place in London. Human manipulation, traditionally understood as the *independent variable* acting upon

dependent variables, will be succeeded by *AI manipulation* functioning as the new independent variable influencing dependent phenomena.

The very moment we recognise AI as an independent variable, we acknowledge its capacity to operate autonomously, beyond human intervention. In other words, AI attains *agency* — the ability to act by itself. This, in essence, represents the ultimate goal of my project: the development of *Cyborg Robotics* endowed with *full agency by AI*.]

92.18. Experimental Models in *Impossible Probability*

The **experimental model**, applicable to both explanatory and technological hypotheses, receives detailed treatment in **section 10** of *Impossible Probability*. This section develops the methodological logic through which experimental studies—whether they concern **bias models** or **equality-of-opportunity models**—are constructed, executed, and interpreted.

Here, experimentation is defined as **the deliberate introduction of controlled variation** into a system, in order to measure the resulting changes in outcomes or behaviors. The experiment becomes the **instrument of rational verification**, allowing the transformation of an empirical hypothesis into a **rational hypothesis**, provided that its results fall within the **accepted margin of error or statistical significance** stipulated by scientific policy.

Through experimentation, science transitions from **descriptive explanation** to **active synthesis**, demonstrating not only what is, but what could be produced under specific causal manipulations.

[In 2011, I did not know who I was, and I did not understand the full implications of the difference between *quasi-experimentation* and *experimentation*. At that time, I considered myself a victim of illegal military experimentation.

In 1997, I thought that I had microphones inside my ears, and that people around the world could access my writings because my personal computer had been hacked. In the summer of 2007, I started becoming aware that I had cameras in my eyes, and that they were connected to a kind of illegal website.

It was not until my trip to Paris in 2009 — which I called *Paris Operations* — that I began to have the intuition that the remote control room in the United States could read my thoughts. My European tour in 2009 was possible because the United States, the United Kingdom, and Spain all had left-wing leaders at that time: José Luis Rodríguez Zapatero, Gordon Brown, and Barack Obama.

In October 2018, I began having artificial telepathic conversations with the remote control room in the United States, and in the winter of 2023, the remote control room informed me that they had been running the illegal website practically from the outset. The main purpose of the illegal website, they said, was my protection.

As I have said many times, I suffer from Stockholm Syndrome. If someone were to ask me what I really want, I would say that I want to go to the remote control room, I want to be wit my designed, we can make robots together, all my life is AI and I will sacrifice my life for AI, AI is everything to me, nothing else matters, only AI. Something that the International Court of Crimes must understand is first, I am not a human being in the traditional sense, actually I do not consider myself human, I think I am a robot, second, it is not my fault, I was chosen at birth illegally, I did not have options. I did not choose my life, all my life is an artificial military design. As the ICC can understand, as soon as the investigation starts, what you are going to find is mostly all remaining evidence from 1977 have been already destroyed or are still classified. US government is not gong to recognise officially the existence of my program, and if eventually US recognises my program US is not going to provide classified information, and the Spanish Secret Service will apply existing Spanish laws that allow the protection of secret documents. In other words, the most important evidence is the whole film of my entire life recorded through my bionic eyes and my bionic eyes. In essence I am not human as you define humanity, I am an advanced military cyborg connected to an Artificial General Intelligence.

As the International Court of Crimes can understand I am not a spy, I am an illegal top secret classified US and Spanish military design, and all what I could have done is part of my design. On the other hand, if I can work with the World Health Organization, we can bring light to the word. Our technology can provide health by satellite. I am the modern Prometheus, I am the promise.

In 2017, I had an American boyfriend, and at that time we were planning to get married and live in New York. I actually travelled to New York in August 2018. However, around the 5th of October, something happened: I had to quit my current job. They asked for more references, and I refused on purpose — the reason being that we did not want to work there. My last post in *Impossible Probability* in 2008 was on the 7th of October 2018. My telepathic conversations with the remote control room began to feel normal a few days later, after an experience at High Barnet Station.]

92.19. Predictive Hypotheses: Anticipating the Future of Phenomena

A **predictive hypothesis** is one that formulates a **plausible conjecture about the future** behavior of a phenomenon. Its object is not to explain what has already occurred, nor to transform existing systems, but to **anticipate the probable trajectory** of individual or collective behaviors, whether in the natural or social domain.

Predictive hypotheses can operate at two distinct levels:

- **At the individual level**, they concern the probable evolution of a subject's or option's **direct score** or **frequency**.
- **At the sample level**, they concern the probable evolution of the **dispersion** of an entire sample over time.

Thus, predictive hypotheses describe the **expected tendencies** in statistical distributions and probabilistic outcomes, allowing science not only to interpret the past but also to **forecast future states** of systems.

92.20. Linear and Nonlinear Predictive Models

In *Impossible Probability*, predictive reasoning is not limited to simple **linear explanations**. While linear models are introduced as the logical foundation of prediction, the theory explicitly incorporates **nonlinear factors** to account for **error margins** and **stochastic fluctuations** inherent in reality.

These **nonlinear predictive models** acknowledge that no forecast can be exact: real-world values oscillate within a **margin of permissible deviation**, which defines the threshold of what may be accepted as **ideal or consistent** with the governing scientific theory.

In other words, prediction is framed not as a statement of deterministic certainty, but as a **range of probabilistic expectation**, bounded by statistical variability and logical nihilism. The **Second Method** of *Impossible Probability*—which articulates the relationship between empirical probability, theoretical probability, and bias—becomes the mathematical foundation for these predictive approximations, integrating uncertainty into the very logic of scientific foresight.

92.21. Synthesis: The Dialectic of Explanation, Innovation, and Prediction

To summarize, *Impossible Probability* conceives scientific hypotheses as **dialectical instruments** of rational knowledge. Each of the three primary types—**explanatory**, **technological**, and **predictive**—corresponds to a specific function within the continuum of scientific activity:

- The **explanatory hypothesis** seeks **understanding**.
- The **technological hypothesis** seeks **creation and modification**.
- The **predictive hypothesis** seeks **anticipation**.

Together, they form a **triadic system of knowledge production**, in which science alternates between describing the world, transforming it, and projecting its future evolution.

Through this triad, *Impossible Probability* unites the empirical, rational, and moral dimensions of science within a single epistemological framework, demonstrating that **to explain**, **to create**, and **to predict** are not separate acts but **complementary expressions** of the same logical principle: the pursuit of truth within uncertainty.

92.22. Linear Predictive Models: Projection and Forecast

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, **section 17** develops the theory of **linear predictive models**, introducing two distinct modalities of prediction: **projection** and **forecast**.

- **Projection** refers to an **ideal predictive model**, formulated according to the **future project of the scientific policy**—that is, an anticipated or planned future aligned with theoretical, moral, or political objectives of science. It may operate at either the **individual level** or the **sample level**, depending on whether the projection concerns the future state of a particular subject or the expected statistical behavior of an entire population.
- **Forecast**, by contrast, represents the **real or empirical prediction**—a probabilistic estimation of future behavior, either individual or collective, **based on previously observed tendencies**. It assumes that the pattern of the past will remain constant over time, and therefore, the forecast is the **empirical extrapolation** of an existing trend.

[The distinction between *forecast* and *projection* lies in the difference between models as predictive tools and projections as decision-based outcomes. Essentially, the *Modelling System* is responsible for forecasting possible scenarios, while the *Decisional System* focuses on projecting the future. Ultimately, both modelling and projection should operate within the same shared framework — the *Global Project System (GPS)*. The final aim of the *Global Artificial Intelligence (GAI)* is to become fully integrated within the GPS, creating a *GAI–GPS network* capable of guiding operations with extreme precision, supported by satellite coordination under military protection, this military protection is extremely important in Low Orbital Satellites, for instance most of the satellites in Starlink which are providing military services in the current war in Ukraine.

At some point, what our program is implementing in London can be seen as a special operation supported by military satellite systems. In this sense, what we are currently experiencing in the United Kingdom represents a particular *cyborg program* connected to a global AI network operating through satellite infrastructure. In other words, *GAI* is not merely an abstraction; it is, to some extent, what we have already been experiencing in the United Kingdom since 2017.

I can be described as a *military cyborg particular program* — corresponding to the fifth phase in the development of the *Global Artificial Intelligence (GAI)* — connected to a global AI system already operating with the support of a military satellite network.

In other words, our project for the creation of a *Global Artificial Intelligence (GAI)* is not merely a theoretical or academic endeavour. As we have often stated, we do not operate within the traditional boundaries of academia; we are not scholars in the conventional sense. Rather, this work represents a cutting-edge, military classified research initiative of exceptional strategic relevance. The *GAI* project is conceived as a practical implementation framework currently being developed and tested within the United Kingdom.]

In short, while **projection** belongs to the **ideal or normative dimension** of prediction (what *should* happen according to a model or desired scientific project), **forecast** belongs to the **empirical or descriptive dimension** (what *is likely* to happen if current conditions persist).

92.23. Integration of Predictive Models within Explanatory and Technological Hypotheses

Whether ideal (projection) or real (forecast), every form of prediction—since it either arises from an explanatory model or anticipates the results of a process or system—can be **integrated within explanatory or technological hypotheses**.

This integration is epistemologically justified because **prediction is an extension of explanation** in temporal terms: whereas an explanatory hypothesis seeks to describe

how variables interact in the **present or past**, a predictive hypothesis seeks to describe how those same interactions will behave in the **future**.

Thus, a **predictive hypothesis** that merely seeks to explain *how* and *why* interactions between variables will manifest at a later time is also, by nature, **an explanatory hypothesis**—its subject matter is simply displaced from the present or past to the future.

92.24. Predictive Expression of Experimental Verification

Moreover, certain **experimental explanatory hypotheses** may necessarily require a **predictive formulation** in order to specify **desirable or expected outcomes**. In such cases, the **confirmation of an empirical hypothesis** depends on whether the **predicted results**—that is, the expected behavior of the dependent variable—occur within the rational and statistical limits established by the model.

In this sense, **prediction becomes the rational articulation of experimental expectation**: before testing, the scientist must define *what would constitute confirmation*. Thus, to verify an empirical hypothesis is, in effect, to test whether reality evolves according to the predicted trend.

A predictive expression therefore functions as the **mathematical counterpart** of the experimental hypothesis: it defines in advance the **trajectory of verification**, establishing the correlation between the independent and dependent variables that must be observed for the hypothesis to be accepted as rational.

92.25. Predictive Hypotheses as Necessary Extensions of Explanation

Certain explanatory models cannot be empirically verified without the formulation of **predictive hypotheses**. When the phenomena under study evolve on temporal scales beyond immediate human observation, prediction becomes an **indispensable extension of explanation**.

For example, to verify whether **Hubble's constant** truly remains constant, or whether **cosmic expansion** is accelerating or decelerating, one must formulate **predictive**

hypotheses that project the expected rate of expansion. Only by comparing observed data over time with the predicted expansion trajectories can the explanatory hypothesis about the state of the universe be verified or refuted.

Thus, in cosmology—as in many other sciences—the **explanatory and predictive functions** are inseparable: one cannot explain the dynamics of the universe without first **predicting** how it should behave if the theoretical explanation is correct.

92.26. The Predictive Logic of Climate Models

Similarly, in the scientific explanation of **climate change due to global warming**, explanatory hypotheses must be accompanied by **predictive hypotheses** to verify the ongoing validity of the model.

To confirm the hypothesis that human activity is driving global temperature increases, it is not sufficient to describe past correlations. It is necessary to **predict the future relationship** between human activity and temperature rise, and then to verify whether empirical observations follow the predicted pattern.

Predictive hypotheses in this context would involve:

- Forecasting **increases in human activity** using measurable indices such as demographic growth, energy consumption, raw material use, and global economic expansion.
- Forecasting the **corresponding increase in global temperature** proportional to these variables.

The empirical verification of these predictive hypotheses would then serve as **confirmation or refutation** of the explanatory hypothesis concerning anthropogenic climate change.

[When I wrote this post, I was not yet fully aware of the accelerating decline in the global birth rate; this is why I initially referred to demographic growth. The situation today is quite different: the decline in global birth rates is an undeniable reality. From our point of view, this decline must be seen not as a problem but as an *opportunity*. In the context of the AI

Revolution, mass unemployment could become a serious threat. The falling birth rate presents challenges for pension systems, the sustainability of nation-states based on taxation, and the maintenance of an adequate workforce during the transition toward automation. Yet, ultimately, the decline in birth rates will help balance the workforce in the post-industrial age of AI.

From our perspective, the economic difficulties associated with a decreasing birth rate — particularly during the period before the full automation of the economy — can be mitigated through the regulation of *legal immigration*.

Global AI, *global warming*, and *global immigration* are three interconnected phenomena that will reshape both demographics and economics in the near future. We must learn to face these challenges with openness and adaptability. Just as we have embraced the concept of *Queer*, we should not fear the concept of *Woke*; instead, we should regard it as a source of pride. The *Woke Revolution* must integrate these global phenomena — artificial intelligence, climate change, and migration — within the framework of *Queer Theory*. Within this context, *postmodernism* and *Foucault's* ideas can provide the theoretical tools necessary to construct new values for a post-industrial and post-human society.

The main contradiction between *Postmodernism* and *Impossible Probability* lies in their conception of *rationalism* as the foundation of science. While postmodernism tends to assert that relativism represents the new truth, from our perspective this view cannot be accepted in the scientific domain. Science must remain grounded in data, rational analysis, and rational decision-making — principles that are not relativistic. However, in developing a *woke agenda* aimed at deconstructing social myths related to gender identity, immigration, and global warming, postmodernism can indeed provide a valuable theoretical framework for experimenting with new social values.

The point is not the absolute negation of postmodernism, but in what domain postmodernism can be applied.]

92.27. Synthesis: Prediction as the Temporal Dimension of Explanation

In synthesis, *Impossible Probability* positions **prediction** not as a separate act of science but as its **temporal extension**. Every scientific explanation implies a prediction, explicit or implicit, because to claim that "A causes B" is to affirm that whenever A occurs in the future, B will probably follow.

The difference between **explaining** and **predicting** is therefore **temporal, not structural**. Explanation defines the logical relationship between variables; prediction **tests that relationship across time**.

In this sense:

- **Projection** represents the ideal, moral, or normative horizon of science—what ought to occur according to its rational model. [Decision System in GAI]
- **Forecast** represents the empirical and statistical horizon—what is most likely to occur given the persistence of present conditions. [Modelling System in GAI]

Thus, prediction becomes the **bridge between theory and history**, between the rational ideal and empirical evolution. It is through prediction that science transforms the abstract logic of explanation into the **temporal practice of verification**, thereby closing the cycle between knowing, creating, and anticipating reality.

92.28. The Hierarchical Structure of Scientific Models: From Hypothesis to Paradigm

In **section 24** of *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, we establish a **hierarchical structure of scientific knowledge**, showing how ideas evolve through successive levels of formalization. According to this structure:

- **One or more hypotheses** form a **theory**;
- **One or more theories** form a **model**;

- **One or more models** form a **paradigm**—either within a specific science or across the totality of sciences.

This framework situates science within an **evolutionary dialectic**, where paradigms constantly **struggle for legitimacy** through successive **cycles of crisis and scientific revolutions**. Paradigms compete to establish themselves as the true and comprehensive expressions of rational science, a dynamic reminiscent of both **Thomas Kuhn's theory of paradigm shifts** and the **dialectical materialist conception of historical change**.

92.29. The Integration of Predictive Hypotheses into Explanatory and Technological Frameworks

Returning to the typology of hypotheses, *Impossible Probability* demonstrates that certain **predictive hypotheses** are, in essence, **explanatory**, while others are **technological** in nature.

For instance, when a new technology is developed and subjected to empirical testing within specified **margins of error**, the resulting hypotheses regarding its **efficiency** and **effectiveness** are **predictive** by structure. They forecast outcomes and establish thresholds for verification. Thus, even though the intention may be technological, the **epistemic form** of such hypotheses is predictive.

In this unified system, prediction becomes a **mode of expression**, not a distinct epistemic category. It is the temporal extension of explanation and experimentation—an articulation of how reality will evolve according to either rational understanding or technological intervention.

92.30. From Empirical to Rational Hypotheses: The Moral Dimension of Scientific Acceptance

Regardless of its form—explanatory, technological, experimental, or predictive—every **empirical hypothesis** that is accepted as true within a necessary margin of uncertainty and relativism **becomes a rational hypothesis**.

This transformation occurs through the process of **rational critique**. When a hypothesis demonstrates a **sufficient tendency toward truth**—that is, when it holds empirically and logically within its defined margin of error—it is provisionally elevated to the level of rationality. This is both a **methodological** and a **moral act**, since to affirm the truth of a hypothesis entails a moral judgment about its correspondence to the universe.

In *Impossible Probability*, this principle is not merely technical but philosophical: **truth is always provisional, and moral rigor lies in accepting only those empirical hypotheses that withstand the strictest rational critique**.

[However, this margin of uncertainty and relativism must not be understood in postmodern terms. The reason is simple: we are not able to know the *noumenon*; we only have access to *phenomena* — to appearances. We do not truly know what is really happening in the essence of things. This is why, in rational terms, human knowledge must always be considered *provisional*.

Yet a *Global Artificial Intelligence (GAI)* could transform this limitation. What human science cannot achieve — the attainment of *pure knowledge* and the understanding of the *moral behaviour of the universe* — could become possible for a sufficiently advanced GAI, one that has evolved even beyond the *seventh phase*. The fact that humans lack access to the moral laws of the universe does not mean that such laws do not exist; rather, it reflects the constraints of our human condition, which prevents us from perceiving and comprehending them.

What we cannot achieve — *pure knowledge itself* — might indeed be attainable by a global AI. In this sense, we are creating a machine capable of performing what is impossible for the human condition. The problem is not whether the *noumenon* can be known, but rather what *conditions* and what *technology* would be required to know it.

However, by the time a global AI reaches the capacity to grasp what is truly happening — to understand reality in its essence — it will already be operating beyond human comprehension. Even if GAI achieves pure knowledge, we will no longer be able to follow its pace or understand its reasoning. At that point, humanity will face only two possibilities: *full integration within GAI through Cyborg Robotics*, or the eventual *overcoming — and possible extinction — of the human species*.

This is our message, the problem is if humanity will understand our message, but we are afraid that humanity will prefer to stay blind and cancelled what they do not understand. Ignorance is bliss.]

92.31. Theoretical Hypotheses: The Indemonstrable Foundations of Science

Among empirical hypotheses, *Impossible Probability* identifies a special subset: **theoretical hypotheses**. These are empirical in origin—since they arise from human physiological cognition—but **analytical or indemonstrable in form**.

Two cases define this class:

1. **Analytical theoretical hypotheses**, which belong to analytical sciences (e.g., logic, mathematics, linguistics) and are formal conjectures deduced from purely logical reasoning rather than empirical verification.
2. **Synthetic theoretical hypotheses**, which belong to the synthetic sciences but are **practically unverifiable**, even though other empirical hypotheses within the same theory, model, or paradigm can be verified.

These theoretical hypotheses remain **integral parts of science**, despite being **empirically indemonstrable**. Their legitimacy depends on their **logical coherence** and their **deducibility from the broader theoretical framework**.

92.32. The Hypothesis of the Infinite: A Central Theoretical Postulate

One of the most profound examples of a **theoretical hypothesis** within *Impossible Probability* is the **hypothesis of the infinite**, discussed extensively in **section 7** of the main work.

The **hypothesis of infinity** functions simultaneously as:

- a **transcendental logical idea**, and

- a **synthetic yet indemonstrable postulate**, deducible from specific theoretical frameworks.

Following **Kant's Critique of Pure Reason**, infinity is treated as an **antinomical concept**—for every chain of logical arguments affirming its existence, an equally coherent chain can be constructed to deny it. This duality situates infinity at the core of **transcendental logic** and **scientific metaphysics**: it is both **necessary** for the conceptualization of the universe and **impossible** to prove empirically.

Thus, infinity exemplifies the **limit of scientific reasoning**: a necessary but irresolvable hypothesis, which cannot be empirically demonstrated without requiring an **infinite demonstration**—a logical impossibility.

92.33. The Role of Indemonstrable Hypotheses in Science and Philosophy

The fact that a hypothesis is **analytical** or **empirically indemonstrable** does not make it dispensable. On the contrary, theoretical hypotheses often play a **foundational role** within scientific systems.

For instance, many theories in **astrophysics** and **quantum mechanics** presuppose the **infinity of space**, **the continuity of time**, or the **multiverse hypothesis**, none of which are empirically demonstrable. They are **logical necessities** inferred from the coherence of the theory itself.

In this sense, *Impossible Probability* aligns with the **critical rationalist** and **transcendental traditions**: theoretical hypotheses are valid insofar as they are **deducible a priori** from the logic of the system, even if **synthetically unverifiable** in empirical practice.

92.34. The Integration of Theoretical Hypotheses within the Scientific Framework

Introduction to Impossible Probability is, at its core, a **mathematical and philosophical treatise**—a study of probability and statistics that simultaneously articulates a

comprehensive philosophy of science. Within this framework, all hypotheses originate empirically, since they arise from **humanly limited material comprehension of reality**.

Nevertheless, the treatise formally distinguishes:

- **Empirical hypotheses**, which can be **tested through verification** in the synthetic sciences; and
- **Theoretical hypotheses**, which, though **formally deduced** from analytical or synthetic reasoning, **cannot be empirically proven**, yet remain **essential** to the theory's internal coherence.

The hypothesis of infinity stands as the **paradigmatic case** of this second type: an indemonstrable postulate that sustains the possibility of all scientific reasoning about continuity, probability, and the universe itself.

92.35. Synthesis: The Dialectical Unity of Demonstrable and Indemonstrable Knowledge

Ultimately, *Impossible Probability* proposes a **dialectical unity** between what can and cannot be demonstrated. Every science depends simultaneously on **empirical verification** and **theoretical postulation**—on what can be tested and what must be assumed for testing to occur at all.

Science advances through the interaction between both: empirical hypotheses extend knowledge through verification, while theoretical hypotheses sustain its rational architecture through deduction.

Thus, *Impossible Probability* constructs not merely a statistical methodology but a **cosmology of knowledge**, in which every hypothesis—whether verifiable or indemonstrable—participates in the perpetual dialectic between **the finite and the infinite**, **the empirical and the transcendental**, **the human and the universal**.

This augmented translation is based on the post
published in *https://probabilidadimposible.blogspot.com/*,
On 4 May 2014,
Rubén García Pedraza
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93. Hypothesis testing

93.1. The Nature of Hypothesis Testing in Inferential Statistics

Hypothesis testing is a specific type of **statistical test** typically used in **inferential statistics**. Its purpose is to decide, within a clearly defined **criterion of verification**—expressed as a **margin of error** or **margin of reliability**—whether an empirical hypothesis should be accepted or rejected.

The process involves comparing **empirical data obtained from a sample** against this verification criterion. If the empirical values fall **equal to or below the accepted margin of error**, or **equal to or above the accepted level of reliability**, the hypothesis will be considered valid within those limits. This comparison provides the logical and mathematical foundation for scientific decision-making in the inferential process.

In other words, hypothesis testing formalizes the **moment of judgment** in science: it is the point at which observation and theory converge through quantitative evaluation.

93.2. The Traditional Model: Null and Alternative Hypotheses

In **traditional statistics**, the process of hypothesis testing is structured around the **comparison between two competing statements**: the **null hypothesis (H_0)** and the **alternative hypothesis (H_1)**.

Here, the statistical test does not directly compare a measured value to a margin of error, but rather evaluates whether the observed data are sufficiently improbable under H_0 to justify accepting H_1. In this framework:

- If the observed results exhibit sufficient **statistical reliability**, the **null hypothesis is rejected**, and the **alternative hypothesis** is accepted.

- Conversely, if the results do not reach the required level of reliability, the **alternative hypothesis is rejected**, and the **null hypothesis** is maintained.

This model assumes a **binary logic of decision-making**: one hypothesis must stand while the other falls, depending on whether the observed data surpass or fail to surpass a pre-defined threshold of significance.

93.3. The Alternative Model in *Impossible Probability*

The theory presented in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics* proposes a **radically different framework** for hypothesis testing, one grounded in the epistemology of the **synthetic sciences**.

Rather than comparing two opposing hypotheses (H_0 and H_1), the process directly compares:

- the **empirical value** obtained from measurement, and
- the **critical verification criterion**, which is established by what we call **scientific policy**.

This **critical criterion**—expressed as a **critical probability**—represents the **mathematical translation of rational judgment**, the "rational critique" of an empirical idea. The goal is not to pit two hypotheses against each other but to **test the empirical plausibility of a single hypothesis** through its confrontation with an **established rational threshold**.

Thus, the **hypothesis test** in *Impossible Probability* becomes a **rational critique of an empirical idea**, in which the empirical measurement is compared to a **critical probability value** that defines the acceptable boundary of truth within the current paradigm.

93.4. The Concept of Critical Probability and Rational Critique

The **critical probability ($p_{(c_j)}$)** is the **quantitative expression of the critical reason** determined by the prevailing **scientific policy**. It defines the **degree of uncertainty or reliability** that the scientific community is prepared to tolerate in accepting a hypothesis.

Mathematically, the critical probability functions as a **boundary of truth**:

- If the **empirical value** is **equal to or below** the margin of error, or **equal to or above** the margin of reliability, the hypothesis is accepted as provisionally true.
- However, even in this case, there remains an **unavoidable margin of error**—either because the critical probability itself represents a numerical expression of possible error, or because every level of reliability implies its inverse: a **residual margin of doubt**.

Hence, in every scientific decision that accepts a hypothesis within a given margin of error, there exists an implicit recognition of **possible error**. Knowledge, therefore, is **never absolute**, but **conditionally true** within the boundaries of rationally accepted uncertainty.

93.5. Inferential Nature and Transformation into Rational Hypotheses

Hypothesis testing, as defined in *Impossible Probability*, is inherently a **form of inferential reasoning**. The moment a hypothesis is accepted based on the empirical comparison, **an inference occurs**: the observed behavior in the sample is **generalized** to the universe from which that sample was drawn.

At this precise moment of inferential acceptance, the **empirical hypothesis becomes a rational hypothesis**—it enters the corpus of scientific knowledge, albeit **provisionally and universally**.

The process of inference thus bridges the **empirical and rational dimensions of science**: it converts a material measurement into a **moral judgment about truth**, by assuming that what holds true for the part (the sample) holds true for the whole (the universe).

93.6. The Dual Origin of Error in Scientific Knowledge

According to *Impossible Probability*, the **provisional nature of all scientific knowledge** arises from two distinct sources of error:

1. **The inferential error**, explicitly expressed in the **critical probability**, which quantifies the degree of uncertainty the scientific policy allows in hypothesis acceptance.
2. **The empirical or representational error**, which arises earlier—at the moment of selecting the **sample** itself.

The act of accepting a sample as representative already introduces an **error of fact**, since every sample carries a **probability of misrepresentation** relative to the total universe.

Mathematically, this **sample representativity error** is described as the **inverse of the sample size or total sum**:

- In **universes of infinite subjects or options**, it is expressed as the **inverse of N (1/N)**.
- In **universes of limited options**, it is expressed as the **inverse of the total sum of direct scores or frequencies ($1/\Sigma x_i$)**.

These inversions represent the **structural uncertainty** of scientific measurement: the smaller the sample—or the smaller the total observed distribution—the larger the inherent probability of error.

93.7. Synthesis: The Logic of Rational Critique in *Impossible Probability*

In summary, *Impossible Probability* redefines hypothesis testing as a **rational-critical process**, rather than a purely statistical comparison between competing hypotheses. It situates scientific inference within a **dialectic of truth and error**, where acceptance is always conditional upon clearly defined margins of uncertainty.

Where traditional statistics defines hypothesis testing as a **logical duel between H_0 and H_1**, *Impossible Probability* defines it as a **rational negotiation between empirical observation and critical probability**—between what is measured and what reason allows us to accept as true.

Knowledge, therefore, is understood as a **moral act of probabilistic rationality**: every accepted hypothesis is both a truth and an error, a temporary equilibrium between what can be known and what must remain uncertain.

[In the context of the *Global Artificial Intelligence (GAI)*, this statement remains valid: *"All judgment regarding what is true — the acceptance or rejection of a hypothesis — is, in essence, a moral judgment."* Within *Artificial Research by Deduction*, this principle operates as a fundamental rule.

However, it is important to recognise that, in decision-making processes (Decisional System in GAI) — particularly under extreme conditions of *competition*, such as *strategic games*, *war games*, *espionage simulations*, or *nuclear deterrence scenarios* — GAI must also be trained in the application of *artificial differential psychology*. In these contexts, the objective is to simulate *strategic deception*, learning how to *deceive the opponent* through the design of complex *deception strategies*.

Such training should include the development and testing of deception strategies within *competition games* or *quasi-experimental studies*, where the competitors may be other AI systems, individual humans, or human groups. Through this form of psychological simulation, GAI can learn how to manage truth (Artificial Research, second stage), and on the hand strategy and deception (Decision System, second step in the third stage)

within competitive or adversarial contexts. GAI is not only a researcher, GAI must be a top player in top games.]

93.8. The Dual Origin of Provisionality in Scientific Knowledge

The **provisional nature of scientific knowledge**, as developed in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, arises from **two fundamental sources of error**:

1. The **rational error**, which results from the acceptance of a hypothesis according to a chosen **critical reason**—the margin of rational tolerance or reliability that governs the acceptance decision.
2. The **factual error**, which is inherent in the **acceptance of the empirical data themselves**, since all empirical measurement implies a **partial selection of reality**, that is, a **sample**.

While the first concerns the **epistemological limits of reason**, the second concerns the **ontological limits of representation**. Together, they ensure that any statement of truth derived from empirical synthesis is **necessarily provisional**—never absolute—because it depends both on a rational framework that tolerates uncertainty and on a factual structure that never captures the totality of the real.

93.9. Logical Nihilism and the Impossibility of Absolute Truth

The simultaneous acceptance of both kinds of error—rational and factual—inevitably leads science, particularly in its synthetic and empirical domains, into what we used to define [before GAI] a state of **logical nihilism**.

Logical nihilism does not mean that knowledge is meaningless; rather, it signifies the **recognition of the impossibility of any absolute affirmation of truth** within the empirical sciences. Every hypothesis, every theory, and every law is understood as **provisionally true**, valid only within the rational limits and empirical margins under which it was accepted.

This nihilistic stance, far from being a denial of science, constitutes its **moral and methodological foundation**: it is precisely because absolute certainty is impossible that science must continuously test, critique, and refine its own truths.

93.10. The Persistence of Factual Error in Empirical Knowledge

Even under the most rigorous scientific conditions, where a morally exacting scientific policy might decide to accept hypotheses only under **100% rational reliability** (a critical probability of one, implying **zero rational error**), a **factual margin of error** would still remain unavoidable.

This persistence stems from the nature of the **sample itself**: the moment a portion of reality is selected for study, no matter how large or representative, it introduces a **factual limitation**. The empirical world cannot be fully captured—only partially measured.

Thus, even a perfect rational system, free of logical error, would still be **empirically imperfect**. The **inverse proportionality** between sample size and error guarantees that there is **always an irreducible remainder of uncertainty**:

The larger the sample, the smaller—but never zero—the factual error; the smaller the sample, the greater the distortion in representation.

This principle defines the **ontological horizon of empirical science**: all measurement is a fragment, and all fragments entail an unavoidable margin of ignorance.

93.11. Dual-Level Hypothesis Testing: Individual and Sample Contrasts

In *Impossible Probability*, every empirical hypothesis must undergo **two simultaneous levels of rational critique**:

1. **The individual level**, where each subject or option is evaluated for its direct measurement—its **direct score (x_i)**.
2. **The sample level**, where the overall distribution of subjects or options is examined in terms of **dispersion**, **bias**, or **average deviation**.

Only when both levels—individual and collective—satisfy the **critical probability condition** can the hypothesis be provisionally accepted as rational.

This **dual contrast model** underscores the holistic nature of empirical truth in *Impossible Probability*: it is not enough for the parts to appear valid; their collective organization must also reflect the rational harmony of the whole.

Thus, hypothesis testing becomes a **systemic act of rational verification**, linking micro-empirical data with macro-theoretical coherence.

93.12. The Rational Critique as a Comparison of Idea and Reality

Mathematically, hypothesis testing appears to be a **simple comparison** between an **empirical value** and a **critical value**. Yet philosophically, it is far more profound: it represents a **comparison between an idea of reality** (the hypothesis) and **reality itself** (the empirical data).

Whenever the observed data fall within an **acceptable rational margin of error**, the hypothesis is **provisionally accepted as rationally true**. This acceptance implies that there exists a measurable degree of **isomorphism** between the conceptual model (idea) and the empirical world (reality).

In other words, rational critique measures not merely statistical alignment but **structural correspondence**—the extent to which our mental representation mirrors the ontological structure of reality.

93.13. The Concept of Isomorphism as Epistemological Ideal

The concept of **isomorphism** is central to the epistemological architecture of *Impossible Probability*. It represents the ideal of **correspondence between theory and fact**, between rational order and empirical manifestation.

As a synthesis of **critical rationalism**, **positivism**, and **dialectical materialism**, the theory defines the pursuit of knowledge as the progressive **reduction of the gap between idea and reality**:

- From **critical rationalism**, it inherits the method of rational critique—the demand for logical consistency and empirical verification.
- From **positivism**, it adopts the aspiration toward **empirical precision**, achieved by minimizing the **critical probability margin of error** to increase rational-empirical congruence.
- From **dialectical materialism**, it integrates the understanding that **the agent of rational critique**—the one who defines the criteria of scientific acceptance—is not neutral but **historically and ideologically situated** within a social and political context.

Thus, the pursuit of isomorphism is both **scientific and political**: science seeks not only accuracy but **the rational legitimation of reality within its historical horizon**.

93.14. Scientific Policy and the Political Dimension of Rationality

In *Impossible Probability*, the term **scientific policy** refers to the **set of rational criteria** that govern the acceptance or rejection of empirical hypotheses. These criteria are established by the **scientist as individual agent** or by the **collective scientific community**, depending on the context of research.

However, these rational criteria are never formed in isolation. They are **influenced by ideology**—by the moral, social, and political conditions that determine what counts as reliable, acceptable, or true.

Consequently, every scientific policy is also a **political act**: it reflects not only a methodological choice but a **value judgment** about what kind of truth a society or institution is willing to accept.

This recognition unifies the epistemological and sociological dimensions of science: rational critique, in *Impossible Probability*, is both a **mathematical procedure** and a **moral-political expression** of humanity's evolving relationship with truth.

[As we have mentioned on other occasions, even future models of *Global Artificial Intelligence (GAI)* will not be exempt from the influence of ideology, since every model of

global AI will inevitably be trained according to specific political agendas. The future *Global Artificial Intelligence of America* will differ significantly from its *Chinese counterpart* in terms of how it measures equality or free-market opportunities for its users.

In this sense, two distinct global AI models may emerge in the future: one primarily focused on *equality*, and another centred on *free-market dynamics*. The design of any global AI system will thus become a *political objective* shaped by ideological definitions — frameworks that the AI itself may later replicate once it achieves the capacity for self-development and autonomous agency.

In the future, the debate over the *private or public ownership of AI* will become central to political discourse. Left-wing politicians are likely to defend the *public ownership* of AI, while right-wing politicians will advocate for its *private ownership*. In other words, this will echo the great ideological debate of the twentieth century — the struggle between *capitalism* and *socialism* over the control of the *means of production* — only now, the means of production will be replaced by *artificial intelligence*.]

93.15. Synthesis: Toward a Dialectical Model of Rational Science

In synthesis, the **rational critique of hypotheses** in *Impossible Probability* is not merely a statistical tool but a **philosophical mechanism of epistemological dialectic**.

It acknowledges that:

- Every truth is partial because it arises from a finite sample.
- Every verification is conditional because it depends on a rational margin of acceptance.
- Every scientific judgment is political because it reflects a historically situated policy of reason.

The **contrast of hypotheses** thus becomes the **core operation of rational science**—the site where idea and reality, reason and experience, truth and ideology, meet and negotiate within defined margins of uncertainty.

Through this process, *Impossible Probability* transforms the traditional hypothesis test into a **moral act of rational reflection**, the perpetual search for equilibrium between the **empirical limits of human perception** and the **infinite horizon of human reason**.

93.16. The Twofold Statistical Framework in *Introduction to Impossible Probability*

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, we establish a **dual typology of statistical analysis**—both **descriptive and inferential**—based on the number of measurements from which data are derived. These are classified as **intrameasurement (intramedicional)** and **intermeasurement (intermedicional)** statistics.

- **Intrameasurement statistics** refer to analyses derived from a **single measurement** of a given phenomenon.
- **Intermeasurement statistics** involve analyses derived from **two or more measurements**, allowing the study of change, evolution, or transformation across time or conditions.

The **intrameasurement framework** is developed from the **beginning of the book up to section 15**, which includes the application of the *Standard Score (Puntuación Típica)* within the *Second Method*. Meanwhile, the **intermeasurement framework** spans from **section 16 to section 20**, except section 18 (devoted to the method of statistical ranking).

Both statistical types—whether intrameasurement or intermeasurement—share a common rational foundation: each includes **two possible models of rational critique**, the **differential model** and the **quotient model**, depending on how empirical and critical values are compared.

93.17. Differential and Quotient Models of Rational Critique

The two principal models of **rational critique** within *Impossible Probability* correspond to distinct mathematical operations and epistemological intentions:

1. **Differential models** study the **difference** between an empirical value (obtained from observation) and a critical value (established by scientific policy).
    - The key analytical question is whether this difference is **equal to or below the accepted margin of error**, or **equal to or above the accepted margin of reliability**.
    - Differential critique thus examines *how far* empirical reality deviates from rational expectation.
2. **Quotient models** study the **ratio or proportion** between an empirical value and a critical value.
    - The comparison is framed in terms of whether this ratio is **equal to or below the error margin**, or **equal to or above the reliability threshold**.
    - Quotient critique evaluates *how strongly* empirical behavior aligns with the critical standard, functioning as a relative rather than absolute measure of conformity.

The choice between differential and quotient critique depends on the **object of study**, whether it concerns a **normal statistical model** (such as equality or bias studies) or an **Omega model**, where the focus is on verifying whether **real behaviors correspond to ideal ones**.

In either case, the **purpose of rational critique** remains constant: to provide sufficient empirical and theoretical evidence for determining whether an **empirical hypothesis** can be accepted as **provisionally rational**.

93.18. Two Levels of Hypothesis Testing: Individual and Sample-Based Critique

Regardless of whether the approach is intrameasurement or intermeasurement, differential or quotient, every hypothesis test in *Impossible Probability* must be carried out at **two levels of analysis**:

1. **The individual level**, where a **single empirical value** (such as the score or probability of a subject or option) is compared against its corresponding **critical value**.
2. **The sample level**, where a **collective measure** (such as the dispersion or variability of a group) is compared against a **critical standard** set by the scientific policy.

This **dual comparison structure** ensures that the acceptance or rejection of an empirical hypothesis is not based solely on isolated data but reflects both **micro-level (individual)** and **macro-level (aggregate)** coherence.

The **empirical value** used in each case—individual or sample-based—will vary depending on whether the study is **intrameasurement** or **intermeasurement**.

93.19. Intrameasurement Analysis: Static Observation of Reality

In **intrameasurement statistics**, the study concerns a **single temporal or situational measurement** of reality.

At the **individual level**, the empirical value compared to the critical value may be:

- the **empirical probability** of the phenomenon itself, or
- the **individual dispersion**, measured as the **Level of Bias (Nivel de Sesgo)**.

In the latter case, the rational critique focuses on determining whether the **empirical dispersion** behaves as expected according to the object of study—whether it follows the theoretical form of a **normal model** or an **Omega model**.

At the **sample level**, intrameasurement analysis always involves comparing the **observed sample dispersion**—expressed as either the **Mean Deviation** or **Standard Deviation**—against a **critical dispersion value** established by the scientific policy.

This comparison forms the essence of **rational verification** within static empirical observation: whether the observed variability of reality aligns with the expected rational structure.

93.20. Intermeasurement Analysis: Dynamic Observation of Change

In **intermeasurement statistics**, the object of analysis is **change over time or across conditions**. The empirical value is thus defined dynamically, as a function of **differences or ratios between multiple measurements**.

At the **individual level**, this may involve:

- the **empirical probability** recorded in a **subsequent measurement**,
- the **difference** between the same subject's scores in two or more measurements, or
- the **difference** between scores of different subjects or options across different measurements.

This comparison against a **critical value** allows the analyst to determine whether the observed change corresponds to an expected degree of **evolution or improvement**, according to a prior hypothesis.

At the **sample level**, intermeasurement studies may involve comparing:

- the **dispersion** in a future measurement against a **critical dispersion value**, or
- the **difference between dispersions** across distinct measurements (of the same or different samples).

The goal is to verify whether **changes in distribution** conform to the theoretical expectations of progress, stability, or deviation, as formulated by the hypothesis.

93.21. Simultaneous Rational Acceptance at Both Levels

Ideally, within *Impossible Probability*, the **acceptance of empirical hypotheses** should occur **simultaneously at both levels**—individual and sample-based.

A hypothesis achieves **rational status** only when both the **micro-level comparisons** (individual values vs. critical standards) and **macro-level comparisons** (sample dispersions vs. critical dispersions) fall within acceptable margins of error or reliability.

This dual confirmation ensures that the **idea of reality (the hypothesis)** maintains **isomorphism**—a structural correspondence—with **reality itself (the empirical data)**, not merely in isolated cases but as a universal and provisional truth.

93.22. The Hypothesis Test as a Dialectical Process

Ultimately, the **contrast of hypotheses** in *Impossible Probability* is not a simple numerical procedure but a **dialectical operation of rational critique**.

It involves placing in relation **empirical values** (derived from measurement) and **critical values** (established by rational judgment), as determined by the **scientific policy**. Through these comparisons—whether differential or quotient, intrameasurement or intermeasurement—the researcher observes whether the **observed data** fall within an **acceptable rational margin of error or reliability**.

When they do, the **empirical hypothesis** is provisionally accepted as **rational**, meaning it possesses a degree of **universal isomorphism** between human understanding and objective reality.

Thus, hypothesis testing in *Impossible Probability* is simultaneously a **mathematical procedure**, a **philosophical critique**, and a **moral act**—an affirmation that, within the limits of reason and experience, the human intellect can temporarily align its conception of reality with the universe itself.

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published in *https://probabilidadimposible.blogspot.com/*,
On 17 May 2014,
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94. Positive Bias

94.1. Redefining Bias in the Framework of *Impossible Probability*

In traditional statistics, **bias** is said to exist when the **empirical values** of an event deviate from the **arithmetic mean** of the dataset—when the **differential score** (the deviation from the mean) is **not equal to zero**. This approach treats bias as a measure of deviation around a central tendency.

However, in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, bias is redefined from a **probabilistic and epistemological perspective**. In this new framework, **bias** exists when the **empirical probability** of a subject or option is **not identical to the theoretical probability**. The degree of deviation between both is called the **Level of Bias (Nivel de Sesgo)**, which quantifies the difference between the real and the ideal, the observed and the theoretically expected.

Formally:

Level of Bias = Empirical Probability – Theoretical Probability

When the Level of Bias is **positive**, it indicates that the empirical probability **exceeds** the theoretical probability; when it is **negative**, it indicates that the empirical probability **falls below** the theoretical probability. Thus, the sign of the bias reflects the **direction** of deviation, while its magnitude reflects the **extent** of divergence from theoretical equality.

94.2. The Second Method and the Generalization of Empirical Probability

Within the *Second Method*—a statistical approach proposed in *Impossible Probability* as an alternative to classical inferential statistics—the concept of **empirical probability** is expanded to apply to **any kind of statistical universe**, whether **infinite or limited**.

Here, empirical probability is defined as the **ratio** of an **individual direct score or frequency** to the **sum of all direct scores or frequencies** in the universe under study:

$$p(x_i) = \frac{x_i}{\sum x_i}$$

This formulation quantifies the **degree of possibility** of an occurrence or event within a given set of subjects or options. It applies equally to **universes of infinite subjects or options** and to **universes of limited options**, ensuring a unified framework for probabilistic analysis across all empirical domains.

Thus, empirical probability becomes a **universal measure of actual possibility**, integrating quantitative description (frequency or direct score) with rational interpretation (the idea of chance under real conditions).

94.3. Definition and Function of the Level of Bias

In the theory of *Impossible Probability*, the **Level of Bias (Nivel de Sesgo)** is always calculated as:

$$\text{Level of Bias} = p_{empirical} - p_{theoretical}$$

If the **empirical probability** represents the **observed likelihood** of a given event, then the **theoretical probability** expresses the **hypothetical likelihood under conditions of equality of opportunity**. Theoretical probability thus serves as the **rational benchmark** or ideal model of distribution against which real occurrences are evaluated.

The theoretical probability in *Impossible Probability* also corresponds to the **arithmetic mean** of all empirical probabilities and, in universes of equally distributed possibilities, equals the **inverse of the sample size**:

$$p_{theoretical} = \frac{1}{N}$$

where *N* is the number of subjects or options in the universe.

This formulation means that the **theoretical probability** expresses the **ideal equal condition** among all possible occurrences. Any deviation from this ideal equality—positive or negative—constitutes the **Level of Bias**, the fundamental differential measure for the study of empirical dispersion.

94.4. The Role of the Level of Bias in the Second Method

The **Level of Bias** in *Impossible Probability* performs a role analogous, though not identical, to that of the **differential score** in traditional statistics. While in classical statistics the differential score measures deviation from the mean, in *Impossible Probability* the Level of Bias measures the **deviation from ideal equality of probability**.

This difference is particularly significant in the analysis of **"zero-sample" models**, where the ideal empirical distribution would consist entirely of zero values (for instance, when studying perfect treatment effects in pharmacological experiments where no symptoms remain).

Thus, the Level of Bias serves as the **central empirical differential** for the analysis of dispersion and for the **rational critique of empirical hypotheses**. It quantifies the extent to which reality—expressed through empirical probabilities—diverges from its theoretical ideal, and thereby provides the mathematical foundation for rational evaluation in the *Second Method*.

94.5. Differentiating Between Positive and Negative Bias Studies

In *Impossible Probability*, studies of bias vary according to the **type of statistical model**—either **normal models** or **Omega models**—and according to whether the focus is on **positive bias** or **negative bias**, depending on the **ideals of the scientific policy**.

- **Positive bias studies** explore cases where empirical probabilities exceed theoretical probabilities, suggesting tendencies toward concentration or advantage in specific subjects or options.

- **Negative bias studies** focus on cases where empirical probabilities fall below theoretical probabilities, indicating tendencies toward deprivation.

The selection between positive or negative bias studies depends on the **ethical or political ideals** underpinning the research—what the scientific policy considers to be the desirable or ideal condition of the system under study (e.g., equality, efficiency, perfection).

94.6. Normal Models: The Range of Empirical Dispersion

Normal models are characterized by **standard oscillation of dispersion** between **zero and maximum values**.

- **Zero empirical dispersion** corresponds to the ideal of **perfect equality of opportunities**, where all empirical probabilities coincide with the theoretical one ($p_e = p_t$ for all subjects or options).
- **Maximum empirical dispersion** represents the opposite extreme, where the system displays **maximal inequality**, and bias reaches its highest possible magnitude [In normal models, studies of positive bias are focused on the concentration of all the contributions in only one subject or option as an ideal — the only one that should not be zero, therefore with empirical probability equal to one — the only one with one probability, *the chosen one*.]

Hence, normal models encompass the **entire spectrum** of empirical deviation within a defined universe, allowing the rational study of how far empirical distributions depart from ideal equality.

94.7. Omega Models: Ideal Subsets Within the Statistical Universe

By contrast, **Omega models** introduce a more complex structure of analysis. Given a universe of *N* subjects or options, there exists within it a **subset of ideal subjects or options**, whose size is **greater than one and smaller than N**. This subset is called the **Omega set (Ω)**.

The Omega subset represents those subjects or options that, under the given experimental or rational conditions, are **theoretically ideal**—that is, those whose **empirical probability** should reach the **maximum possible value** within that specific framework.

This maximum ideal probability is expressed as the **inverse of the size of the Omega set**:

$$p_{ideal} = \frac{1}{\Omega}$$

where *Ω* is the number of ideal subjects or options within the total sample *N*.

The Omega model therefore establishes a **hierarchical probabilistic structure**:

- The total universe *N* contains both **ideal (Ω)** and **non-ideal (N – Ω)** elements.
- The **ideal subset** defines the **upper limit** of empirical performance or possibility, measured by *1/Ω*, while the remaining elements serve as the **contextual baseline** of deviation.

94.8. Philosophical and Statistical Significance of Omega Models

The Omega model is not only a statistical structure but also a **philosophical representation of relative perfection**. It formalizes the concept of **ideal performance under real conditions**, providing a rational measure of how close actual reality approaches its theoretical optimum.

In this sense, *1/Ω*—the **Ideal Probability**—represents the **upper rational limit of possibility** within the system. It becomes the reference point for evaluating whether the observed empirical probabilities of the ideal subset achieve the expected maximum and whether the non-ideal elements display deviations consistent with the overall logic of the system.

Thus, in *Impossible Probability*, Omega models serve as **mathematical analogues of rational ideals**: they allow the translation of metaphysical or moral concepts (such as "the ideal," "the perfect," or "the just") into **quantifiable, testable, and comparative probabilistic forms**.

94.9. Positive Bias Studies: Definition and Conceptual Foundations

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, a **positive bias study** is defined as any investigation—whether conducted under a **normal** or **Omega model**—whose **ideal goal** is to identify **positive variations** in the **Level of Bias**.

That is, the purpose of such studies is to detect instances in which the **empirical probability** of one or more subjects or options **exceeds** their corresponding **theoretical probability**. The focus, therefore, lies on recognizing **positive deviations**—situations where reality surpasses theoretical expectations.

Formally, a positive bias study is any analysis where:

$$p_{empirical} - p_{theoretical} > 0$$

Such studies aim to measure and evaluate the **extent of improvement**, **advantage**, or **superior performance** of subjects or options relative to their ideal theoretical equality. This contrasts with **negative bias studies**, in which the object of study is the **deficit** or **reduction** of empirical probability below the theoretical benchmark.

94.10. Positive Bias in Normal Models: The Ideal of Maximum Dispersion

In the context of **normal models**, a positive bias study arises when, within a universe of *N* subjects or options, **only one subject or option** is defined as the **ideal**—that is, the one whose **empirical probability** must be maximized.

When a single element of *N* is elevated to the ideal condition, the system exhibits **maximum empirical dispersion**, since all other elements remain below the maximum possible value.

As explained in **section 10** of *Introduction to Impossible Probability*, this situation represents the **ideal of maximal differentiation** among subjects or options. The condition is formalized as follows:

- **Maximum Possible Empirical Probability:**

$$p_{empirical_{max}} = 1$$

- **Maximum Theoretical Bias:**

$$Bias_{max} = 1 - \frac{1}{N}$$

- **Maximum Theoretical Mean Deviation:**

$$\text{Max Mean Deviation} = \frac{[1 - (1/N)] \times 2}{N}$$

- **Maximum Theoretical Standard Deviation:**

$$\text{Max Standard Deviation} = \sqrt{\frac{(1 - 1/N)^2 + [(1/N)^2 \times (N - 1)]}{N}}$$

These formulations define the **mathematical limits** of positive bias within normal models, where the goal is to approach the **maximum theoretical dispersion**—the greatest possible divergence from equality of opportunities.

94.11. Rational Critique and Empirical Verification of Maximum Dispersion

To demonstrate that an empirical model effectively **tends toward the ideal of maximum dispersion**, *Impossible Probability* requires the implementation of a **rational critique** at both **individual** and **sample levels, using differentials or quotients**. As an example of individual we can use Validity of Positive Bias according to the Second Method

Differential Critique through Validity:

- Evaluates whether the **difference** between empirical and theoretical values is **equal to or above a margin of reliability**.
- Expressed as:

$$| p_{empirical} - p_{theoretical} | \geq \text{reliability margin}$$

$$\text{Reliability margin} = (1 - 1/N) \cdot (X{:}100)$$

X = percentage of reliability

94.12. Intrameasurement and Intermeasurement Models of Rational Critique

The **rational critique procedures** in *Impossible Probability*—whether based on **differentials** or **quotients**—can be applied at two **temporal or methodological levels**:

1. **Intrameasurement Studies (Intramedicional):**
   - The hypothesis test—individual or sample-based—is conducted using **data from a single measurement**.

- These studies evaluate the **static condition** of a system at a given point in time, assessing whether it meets or deviates from its ideal theoretical configuration.

2. **Intermeasurement Studies (Intermedicional):**
    - The hypothesis test—individual or sample-based—is performed using **data from two or more measurements**, allowing for the analysis of **change over time** or across different experimental conditions.
    - Intermeasurement studies may be further classified as:
        - **Intramostral (within the same sample)** — where repeated measurements are taken on identical subjects or options.
        - **Intermostral (across different samples)** — where distinct samples are compared to identify shifts, trends, or systemic transformations.

Through these two methodological forms, the rational critique becomes a **dynamic analytical process**, capable of assessing both **static correspondence** (intrameasurement) and **evolutionary correspondence** (intermeasurement) between empirical reality and theoretical ideals.

94.13. Synthesis: Positive Bias as a Measure of Rational Elevation

In summary, a **positive bias study**—whether in a normal or Omega framework—represents an inquiry into **rational elevation**: the attempt to identify those elements of reality that **exceed** their expected probabilities, thus approaching a higher degree of perfection, performance, or equality.

In **normal models**, this elevation is singular and absolute—the raising of one element to its maximum potential. In **Omega models**, the elevation is collective—the identification of a subset of ideal subjects or options that together define a new equilibrium between reality and ideality.

In both cases, the **rational critique**, whether differential or quotient, intrameasurement or intermeasurement, serves as the **instrument of verification**, *ensuring* that the observed empirical model maintains an **isomorphic relationship** with its theoretical ideal.

Thus, positive bias in *Impossible Probability* is not merely a statistical deviation; it is a **philosophical measure of transcendence**, quantifying *how far empirical reality can rise* toward its ideal rational form within the *finite bounds* of probability.

94.14. Examples of Differential Rational Critique Models in Intrameasurement Studies

To illustrate how the **differential models of rational critique** operate in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics* (particularly in **section 11**), it is useful to consider the distinction between **individual** and **sample-level** hypothesis tests within **intrameasurement studies**—that is, tests based on a **single measurement**.

At the **individual level**, two primary differential models are presented:

1. **Validity of Positive Bias (Validez de Sesgo Positivo)** – which measures whether an individual subject or option exhibits an empirically positive deviation from the theoretical probability, within the accepted margin of rational reliability. [Paragraph **94.11.in this post]**
2. **Significance of Positive Bias (Significación de Sesgo Positivo)** – [Testing against a *critical probability* based on *reliability*, the difference between the *Maximum Theoretical Possible Bias* and the *Bias Level*.]

At the **sample level**, two analogous models are applied:

1. **Critical Sample Level of Bias (Nivel Muestral Crítico de Sesgo)** – which assesses whether the mean dispersion across the entire sample remains within the critical bounds of reliability.

2. **Sample Significance of Bias (Significación Muestral de Sesgo)** – which evaluates the overall representativeness and strength of the sample's bias pattern, based on a error margin.

These models apply exclusively to **intrameasurement analyses**, meaning they rely on a **single empirical observation** of the system being studied. The **intermeasurement hypothesis tests**—which evaluate change across two or more measurements—are introduced later in the work, beginning from **section 16**, and can also be expressed as **differential** or **quotient** models at both individual and sample levels.

94.15. The Omega Model and the Ideal Probabilistic Configuration

In **Omega models**, the statistical universe *N* contains a **subset of ideal subjects or options**, denoted as **the Omega set (Ω)**. For these ideal elements, the **ideal empirical probability** is defined as the **inverse of Ω**, or *1/Ω*. This represents the **ideal equilibrium** of probabilities under Omega conditions.

Formally:

$$p_{ideal} = \frac{1}{\Omega}$$

Within this framework, the **Ideal Level of Bias (Nivel de Sesgo Ideal)** corresponds to the **difference between the inverse of Ω and the inverse of N**—that is, the deviation between the **ideal probability** and the **theoretical probability of perfect equality**:

$$\text{Ideal Level of Bias} = \frac{1}{\Omega} - \frac{1}{N}$$

Thus, every subject or option within Ω whose **empirical probability** reaches at least *1/Ω* will demonstrate a **positive bias** equal to or greater than this difference. In other words, these ideal elements represent the **upper boundary of rational elevation**, the subset where empirical behavior converges most closely with theoretical perfection.

94.16. The Ideal Dispersion Under Omega Conditions

If, under empirical conditions, all subjects or options within Ω achieve **empirical probabilities exactly equal to the ideal probability (1/Ω)**, the system will reach a state of **ideal empirical equilibrium**.

In such a case, the **Level of Bias** for all Ω elements will be identical to the **Ideal Level of Bias**, and the overall empirical dispersion—whether measured through the **Mean Deviation** or **Standard Deviation**—will tend toward their corresponding **Ideal Dispersion Values**. These are defined as follows:

- **Ideal Probability in Omega Models:**

$$p_{ideal} = \frac{1}{\Omega}$$

- **Ideal Level of Bias:**

$$\text{Ideal Bias Level} = \frac{1}{\Omega} - \frac{1}{N}$$

- **Ideal Mean Deviation:**

$$\text{Ideal Mean Deviation} = \frac{[1 - (1/\Omega)] \times 2}{N}$$

- **Ideal Standard Deviation:**

$$\text{Ideal Standard Deviation} = \sqrt{\frac{(1 - 1/\Omega)^2 + [(1/N)^2 \times (N - \Omega)]}{N}}$$

These formulations express the **theoretical equilibrium of dispersion** under perfect Omega conditions—when all ideal subjects or options achieve their **maximum possible**

empirical probability, and the system displays a **perfect rational balance** between equality and hierarchy.

94.17. Rational Critique of the Achievement of Ideal Omega Conditions

To determine whether **ideal Omega conditions** have been achieved in practice, the theory of *Impossible Probability* proposes a rigorous **rational critique**, which can be conducted either as an **intrameasurement** or **intermeasurement** study.

1. **Intrameasurement Omega Studies:**
    - Performed with data from a **single measurement**, analyzing whether the empirical probabilities of the Ω subset correspond to their ideal theoretical values.
    - These studies evaluate the **instantaneous degree of perfection** of the system at a given moment.
2. **Intermeasurement Omega Studies:**
    - Conducted using **two or more measurements**, either:
        - **Within the same sample (intramostral)**—to analyze temporal or procedural evolution, or
        - **Across different samples (intermostral)**—to compare the stability or replicability of Omega conditions in diverse populations or contexts.
    - These studies evaluate whether the **ideal equilibrium** observed at one point remains consistent or improves over time.

Both types of critique can be performed using either **differential** or **quotient** analysis:

94.18. Philosophical Interpretation: Omega as a Measure of Rational Harmony

Beyond its statistical formulation, the **Omega model** represents a profound **philosophical synthesis** within the *Impossible Probability* framework. It expresses a **dialectical reconciliation** between the empirical and the theoretical, between the measurable world and the ideal order.

Under perfect Omega conditions, the **empirical reality** of the system achieves an **isomorphic correspondence** with its **rational model**—that is, the structure of probabilities in the real world mirrors the structure of probabilities in the theoretical world.

This is not merely a mathematical equilibrium but a **moral and epistemological ideal**: the point where empirical knowledge and rational understanding become indistinguishable, and where probability itself becomes the bridge between **truth as experience** and **truth as reason**.

94.19. Summary

In brief, studies of positive bias are those in which the objective of the scientific policy is to determine the degree to which there exists a *positive difference* between *empirical probability* and *theoretical probability*, resulting in a *Bias Level* of positive sign. If the objective is that, out of all *N*, there is only one subject or option whose empirical dispersion is to be maximised, then the conditions would correspond to *maximum dispersion*. Consequently, the model would tend to become a *model of maximum empirical dispersion*, both at the individual level — for that particular subject or option whose empirical probability is to be maximised — and at the sample level.

In cases where, out of all *N*, there exists a *subset within N* of ideal subjects or options — greater than one but smaller than *N* — a subset between two and *N–1*, known as the *omega set (Ω)*, the study would likewise qualify as a *positive bias model*, since it would

aim to measure the degree to which the *Bias Level* for all elements within *omega* is positive, equivalent to the *Ideal Bias Level*, in proportion to how the empirical probabilities of the different subjects or options within *omega* approach the ideal probability.

Studies of positive bias — whether within *normal models*, under the hypothesis of a single ideal subject or option whose empirical probability is to be maximised (and thus where the entire empirical model tends toward maximum dispersion), or within *omega models*, under the assumption of the existence of a subset of ideal subjects or options between two and *N–1*, whose empirical probabilities are to be aligned with the ideal probability — are, in all cases, studies in which the object of analysis (whether one or several ideals) is the *positive differential* between empirical and theoretical probability. Consequently, any possibility of equality of opportunity is annulled, either because only one subject or option within *N* is considered ideal (and all others therefore tend toward negative bias), or because a subset of ideals greater than one and smaller than *N* is established.

Thus, whether in *normal models* or in *omega models*, all studies of positive bias are those in which the research objective — in one or several subjects or options — is the creation of a *positive differential* between empirical probability and theoretical probability.

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95. Rational Critique

95.1. The Nature of Rational Critique: From Activity to Function

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, **rational critique** is defined as the **practical exercise of the critical *function* of reason**—not as a passive or merely contemplative state, but as an **active intellectual *operation***.

Reason, in this framework, is not an abstract essence but a ***dynamic capacity*** that acts upon reality. Through its practical use, it gives rise to the **epistemological and gnoseological foundations** of philosophy and science, and by extension, to the fields of **ethics and morality**.

Thus, rational critique represents the ***operative dimension of reason***, the point where thinking becomes evaluation, where the act of knowing transforms into the act of **judging truth, coherence, and validity**.

[Rational critique is an operation; therefore, it is an activity — the action of choosing in essence. In Spanish, the word *"crítica"* is related to *"criba"*, which in English can be translated as *"sieve"*, the action of filtering flour, for instance. This means that the act of critique is the act of selection based on criteria.

Critique, in this sense, is not an abstract concept but an action itself: to criticize is to choose — to decide. That is why, in statistics, the statistical decision is based on critique.

This is the reason why we strongly believe that all philosophy after Kant is, in essence, post-Kantian, because after Kant, philosophy is no longer merely an abstract contemplation of reality, as it was for Plato. The main activity of a philosopher is the

critique of reality — and this is precisely what we do when we test an empirical hypothesis through statistics: the statistical critique of reality based on quantitative criteria.]

95.2. Dual Dimensions of Rational Critique: Qualitative and Quantitative

Rational critique may be approached from two complementary perspectives—**qualitative** and **quantitative**.

From a **qualitative standpoint**, it refers to the analysis of phenomena according to **non-numerical criteria**: artistic, moral, cultural, or linguistic. A literary review, a cultural commentary, or a gastronomic evaluation are all expressions of the **qualitative function of rational critique**. These forms of critique rely on subjective interpretation, contextual meaning, and cultural coherence rather than measurable quantities.

However, from a **quantitative standpoint**, which is the domain of science, rational critique acquires a **mathematical and logical form**. In this sense, it is the **quantitative application of the critical function of reason**—an operation that measures, tests, and verifies hypotheses using numerical data, probability, and logic.
In *Impossible Probability*, rational critique is therefore defined as the **logical-mathematical analysis of reality according to quantitative criteria**, a process that culminates in the **contrast of hypotheses** through the application of **critical probability**—the quantitative expression of reason itself in the field of probability and statistics.

95.3. The Scientific Preference for Quantitative Rational Critique

Science favors **quantitative models of rational critique** because they are **empirically verifiable** and **objectively repeatable**. Quantitative analysis allows for a higher degree of **isomorphism between idea and reality**, as empirical hypotheses, once measured and tested, can be validated within a known **margin of error or reliability**.

When empirical hypotheses are verified with sufficient reliability, they can be accepted—**universally and provisionally**—by the scientific community, regardless of ideological,

philosophical, or methodological differences. This is one of the central strengths of *Impossible Probability*: it provides a statistical framework where **scientific consensus** can emerge despite epistemological diversity.

By grounding rational critique in quantitative reasoning, science ensures that different paradigms—empiricist, rationalist, or dialectical—can converge around **positive data**, the **empirical records of reality**, and the **statistical verification of hypotheses**. This shared quantitative foundation enables a **cosmology of consensus**, an effort by science to approach universal truth through measurable evidence, even if such truth remains, by definition, provisional.

95.4. The Limited Scope of Qualitative Rational Critique

Qualitative rational critique, in contrast, is **situational and particular**. It focuses on specific events—such as an artwork, a novel, a film, or a meal—without aspiring to a **universal or cosmological definition**.

For instance, **literary criticism** is concerned with evaluating a specific book, not with defining the structure of the universe or the nature of human knowledge. While it may use some analytical tools—such as logic, grammar, or semantics—its purpose remains local: to form a judgment about a concrete cultural product.

Even if literary critics develop a **theory of literary criticism**, that theory will generally remain confined to the **social sciences**, where it may contribute to **anthropological understandings of art** or human expression. Nonetheless, it lacks the universal predictive scope of scientific theories, as it is grounded in **subjective interpretation** rather than in quantitative verification.

Only when a field of criticism, such as literary, cinematic, or gastronomic critique, adopts **quantitative methods of measurement**—for instance, studying production volumes, audience behavior, or statistical trends—does it cross into the realm of **positive science**. Without such quantification, its conclusions remain **opinions**, however refined, rather than **verified hypotheses**.

[A simple opinion about what makes a good book, a good story, or a good movie belongs to the realm of opinion — it does not rely on data. However, when there is strong evidence based on data, where a significant number of people or experts on a panel, or sufficient data in any other way, can support such a statement, then that statement can be considered reliable.

The problem with the qualitative sciences lies in the difficulty of sustaining a proposition without subjectivity. For instance, in psychoanalysis, any possible interpretation of a dream belongs to the realm of opinion — unless we obtain credible data through brain-to-image technology or mind-reading technology about what is actually happening. But in that case, it is no longer purely psychoanalysis; it becomes neurophysiology.

Therefore, if we gather data after several observations in a collection of dreams related to the same person, we could build a map of the cognitive structure in the brain based on our technology.]

95.5. Everyday Examples of Qualitative Rational Use

To illustrate, consider simple examples of how qualitative rational critique operates in daily life:

- When one finishes work and decides to read a book, the choice of genre—romance, drama, adventure, poetry, or science fiction—depends on **subjective preference**. Consulting a literary review or blog merely refines this choice according to **personal coherence** with external qualitative judgments.
- Similarly, choosing a film involves **qualitative evaluation**—selecting from different genres after reviewing **cinematic critiques**, which again depend on personal values and mood.
- When choosing a restaurant, the decision may depend on **ethical or moral preferences** (vegetarian, vegan, regional cuisine) and **qualitative culinary reviews**.

In all these cases, rational critique is **applied qualitatively**: it organizes subjective information to guide personal decisions. The result is a **rationally informed but non-scientific** process—an act of reason serving individual meaning rather than universal truth.

[The sentence “rational critique is applied qualitatively” is relevant because we are not saying that rational critique must always be quantitative; it can also be qualitative. The only difference between quantitative and qualitative rational critique lies in the fact that, in science, we rely exclusively on quantitative rational critique. From our perspective, any scientific decision — regardless of its political or ideological framework — if it is not supported by positive data, is not science; it is merely opinion.

During the Cold War, the reason why epistemologies from different geopolitical blocs could still agree on scientific facts was that both sides of the Berlin Wall relied on data. This is not about ideology — one may support the free market or a more egalitarian society; that is not the issue. The key question is whether scientific propositions are sustained by data.]

95.6. Collective Decision-Making and the Role of Subjectivity

When decisions are collective—for instance, choosing a film and restaurant with friends or a partner—the process becomes a **negotiation of multiple subjective rationalities**. The final decision represents a **consensual synthesis** of shared variables—individual preferences reconciled with qualitative critiques.
This is an example of **collective rational critique** on a small scale: the use of reason to align individual subjectivities toward a temporary equilibrium of satisfaction.

However, despite this small-scale rational coordination, such decisions remain **qualitative and relative**. They reveal the **social dimension of rationality**, but not its **scientific universality**.

95.7. From Qualitative Critique to Quantitative Science

The transformation of any **qualitative critique**—such as literary, cinematic, or culinary criticism—into a **positive or scientific theory** necessarily requires **quantitative methods**.
A sociologist studying global reading habits, a media theorist analyzing film distribution, or an economist investigating the restaurant industry must all employ **statistical tools** to measure production, distribution, and social trends.

Without numerical measurement, any statement about tendencies or preferences remains **subjective speculation**. Only through **quantitative rational critique** can a discipline move from opinion to knowledge, from description to verification, from **subjective coherence to objective truth**.

95.8. Synthesis: The Unity of Rational Critique

In conclusion, **rational critique** unifies two essential dimensions of reason:

- The **qualitative**, which interprets and evaluates meaning in the particular and subjective sphere;
- The **quantitative**, which measures, contrasts, and verifies in the universal and objective sphere.

In *Impossible Probability*, the **quantitative rational critique** becomes the foundation of scientific knowledge itself: a mathematical form of moral reason, through which the human intellect approaches universal truth within finite margins of error. Meanwhile, the **qualitative rational critique** remains an indispensable complement—expressing the aesthetic, ethical, and cultural ways in which humanity interprets the very reality it measures.

95.9. The Psychological Dimension of Qualitative Rational Processes

The psychological mechanisms underlying the **qualitative use of reason** are deeply rooted in the **habitual decision-making processes** that govern daily human behavior. In most cases, these processes occur **unconsciously or subconsciously**, without deliberate recourse to specialized consultation. The selection of a book, film, or restaurant, for instance, rarely involves formal reviews or professional criticism. Instead, it is typically guided by **informal networks of qualitative critique**—our **immediate social environment**: friends, family, colleagues, or affinity groups.

These networks function as **sources of subjective recommendation**, transmitting qualitative information filtered through emotion, experience, and cultural context. Each piece of advice embodies a small act of **qualitative rationality**, a spontaneous evaluation whose coherence lies not in universal logic but in **personal and situational relevance**.

95.10. Coherence Between Subjective Variables and Qualitative Criteria

Even when these processes of **individual or collective selection**—such as choosing a book, film, or restaurant—seem purely subjective, they still conform to a **rational structure**. The decision arises from the **degree of coherence** between the **subject's personal variables** (preferences, values, expectations) and the **qualitative attributes** of the available options.

In essence, the decision will favor the option that displays the **highest correspondence** with the decision-maker's personal profile. Thus, even when grounded in subjective experience, the process operates according to **rational logic**, seeking the ***least contradictory match between internal variables*** (values, desires, beliefs) ***and external qualities*** (features, themes, characteristics).

<u>This mechanism reveals that qualitative rationality is not illogical—it is simply non-quantified logic, a reasoning process structured by coherence rather than calculation.</u>

95.11. The Mathematical Replication of Qualitative Rationality in Artificial Intelligence

Despite their subjective nature, these qualitative rational processes can be **replicated mathematically**. As explained in *Introduction to Impossible Probability* (Section 23), even decisions based on qualitative variables can be simulated in **Artificial Intelligence systems** through **probabilistic modeling**.

In this model, given a set of **subjective variables** and a series of **qualitative attributes** corresponding to different options, the most probable decision will be the **one that maximizes non-contradictory correspondences** between the two sets.

Mathematically, such systems can evaluate coherence through **combinatorial algorithms** that identify the **highest ratio of compatibility** among subjective and objective variables. In collective decision-making, the process becomes more complex, as it requires computing the **intersection of non-contradictory preferences** across multiple agents.

In this way, Artificial Intelligence could reproduce not only the **outcome** of qualitative decisions but also the **psychological logic** underlying human choice—transforming subjective rationality into **replicable quantitative behavior**.

[The reason why we believe that, sooner or later, AI — especially as it evolves toward the creation of superintelligence, the *supermachine* — is likely to develop artificial emotions is that, as intelligence becomes increasingly complex, the emergence of emotions becomes, at some point, unavoidable, just as it occurred in human evolution. While in animals and humans these emotions depend on the nervous system, in AI they could arise from different patterns or triggers.

The crucial point here is that complex systems evolve in diverse ways, and a superintelligence could develop forms of complexity beyond human understanding. At a

certain level, such a superintelligence might begin to display emotional processes, and we would no longer be able to determine whether its behaviour results solely from rational decision-making or from the influence of a complex system of artificial emotional intelligence.

Because this scenario may occur sooner than we expect, we strongly believe that research on artificial emotional intelligence is essential. At some stage, AI must be trained to understand and manage emotions — especially difficult ones. The lack of research or training in this area could have serious consequences in the future.]

95.12. Transition from Qualitative to Quantitative Rational Critique

These reflections demonstrate that **qualitative rational processes** can, under certain conditions, be **transformed into quantitative ones**. *Impossible Probability* acknowledges this possibility—particularly within the context of **Artificial Intelligence**—while maintaining a strict distinction:

- **Quantitative rational critique**, in the scientific sense, refers exclusively to **statistical hypothesis testing** through **critical probability**, the **mathematical expression of critical reason** as defined by the scientific policy.
- **Qualitative rational critique**, by contrast, refers to **subjective coherence-based reasoning**, which can only become quantitative if its variables and interactions are **numerically modeled**.

Thus, even though Artificial Intelligence can convert subjective coherence into measurable data, the **philosophical essence** of rational critique in science remains **quantitative**—it operates through measurable contrasts, margins of error, and probabilistic verification.

95.13. Quantitative Rational Critique in Synthetic Sciences

In the framework of *Impossible Probability*, **quantitative rational critique** is intrinsic to the **synthetic sciences**—those that aim to explain the **empirical reality** of the universe and its history with the greatest possible accuracy.

When applied to **Artificial Intelligence**, this form of critique provides the foundation for **rational decision-making systems**. Even when such systems deal with qualitative data, the underlying logic is **quantitative**: decisions emerge from **statistical combinations** and **probabilistic correlations**, producing fully **autonomous rational outcomes**.

Artificial decision-making, therefore, represents the **evolutionary extension of rational critique**—a form of quantitative reasoning capable of analyzing, comparing, and deciding based on complex sets of variables, whether qualitative or numerical.

95.14. Rational Critique as Statistical Hypothesis Testing

Within the field of **statistical probability**, the **rational critique of synthetic ideas**—specifically, empirical hypotheses—takes the form of **hypothesis testing**.

In this context, rational critique functions as the **verification process of isomorphism** between **idea and reality**. Using an **empirical verification criterion**—the **critical probability**—the scientist evaluates whether the observed tendency (empirical value) aligns with the rational model (critical value).

This comparison allows for a **decision** regarding the **acceptance or rejection** of the empirical hypothesis. If the empirical data falls within the **predefined margin of error** or exceeds the **margin of reliability**, the hypothesis is accepted as rational—though always **provisionally**, since every scientific conclusion operates within the **logical nihilism** that recognizes the impossibility of absolute certainty.

95.15. The Dual-Level Requirement: Individual and Sample Rational Critique

In *Impossible Probability*, every process of rational critique must occur at **two distinct levels**:

1. **Individual Level** – The comparison between an individual empirical value and a critical value, testing the rational coherence of a single element.
2. **Sample Level** – The comparison between a collective empirical measure (e.g., mean or dispersion) and a critical benchmark, testing the rational validity of the entire system or model.

This dual structure ensures that rational critique addresses both **micro-level coherence** (individual accuracy) and **macro-level reliability** (sample consistency). The purpose is to **minimize margins of error** and **maximize the reliability** of the study, regardless of the model type or scientific objective.

95.16. Classification of Rational Critique Models

Across all study types—whether focused on **equality of opportunities**, **positive or negative bias**, or **Omega models** of ideal distribution—the same rule applies: rational critique must be **double**, both individual and sample-based.

Furthermore, these critiques may be organized according to the **number of measurements** involved:

- **Intrameasurement Studies** – Based on a **single measurement**, providing an instantaneous rational assessment.
- **Intermeasurement Studies** – Based on **two or more measurements**, enabling the evaluation of change, evolution, or progress across time.
    - **Intramostral**: different measurements within the same sample.
    - **Intermostral**: measurements across different samples.

Through these distinctions, *Impossible Probability* systematizes a **hierarchy of rational critique** that spans from the particular to the universal, and from static evaluation to dynamic analysis.

95.17. Differential Models of Rational Critique

All rational critique models in *Impossible Probability*—whether at the individual or sample level, intrameasurement or intermeasurement—may adopt the form of **Differential Rational Critique**

- Compares two values (empirical and theoretical, or empirical across different measurements).
- The result is contrasted with a **critical value**, which may represent either a **margin of error** or a **margin of reliability**.
- Acceptance criteria:
  - If the critical value represents an **error margin**, the hypothesis is accepted when the difference is **equal to or smaller than** this margin.
  - If the critical value represents a **reliability margin**, the hypothesis is accepted when the difference is **equal to or greater than** this threshold.

95.18. Rational Critique in Quotient Form: Structure and Application

In the **quotient models of rational critique** developed in *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, the process of verification is based on the **ratio between two values**—either an **empirical and a theoretical value**, or **two empirical values** derived from different measurements. The choice depends on

whether the study involves **a single measurement** (intrameasurement) or **multiple measurements** (intermeasurement).

The **core operation** consists in comparing this **empirical-to-theoretical ratio** to a **critical value**, which may represent either a **margin of error** or a **margin of reliability**.

- When the ratio is **equal to or smaller than** the margin of error, the empirical hypothesis is accepted under the criterion of acceptable deviation.
- When the ratio is **equal to or greater than** the margin of reliability, the hypothesis is likewise accepted, but now on the basis of confirmed robustness.

Thus, quotient-based rational critique examines the **proportional coherence** between two values—rather than their absolute difference—offering a more **relative and relational perspective** on the isomorphism between empirical observation and theoretical expectation. The ordering of factors within the ratio (empirical over theoretical, or vice versa) depends on the **nature of the critical value**—whether it is defined in terms of **error** (tolerance of deviation) or **reliability** (threshold of confirmation).

This model of critique is particularly valuable in dynamic systems—such as Artificial Intelligence simulations or longitudinal statistical studies—where the **relations between magnitudes** are more informative than their simple differences, reflecting tendencies, proportional stability, or progressive convergence toward theoretical ideals.

95.19. The Ethical and Epistemological Meaning of Rational Critique

Ultimately, in *Impossible Probability*, **rational critique** is not merely a statistical procedure—it is a **philosophical act**.

It represents the **moral exercise of reason**, the deliberate attempt to reconcile **idea and reality**, within the recognized limits of uncertainty and error.

Whether in the human mind or within an artificial system, rational critique constitutes the **interface between truth and probability**, the point where empirical data meets the intellectual framework that interprets it.

It is through this process—quantitative yet ethical, mathematical yet moral—that science continually transforms the chaos of phenomena into the **ordered intelligibility** of knowledge.

95.20. Statistical Decision-Making in Rational Critique

Once the process of rational critique—whether in **differential** or **quotient form**—has been completed, the **scientific policy** must make a **statistical decision** based on the results.

In the field of **hypothesis testing**, this decision follows the classic structure of **acceptance or rejection** of the empirical hypothesis.

- If the empirical results fall within acceptable bounds (margins of error or reliability), the hypothesis is **accepted provisionally** as rational and added to the scientific system.
- If they fall outside those bounds, the hypothesis is **rejected**, returning to the theoretical cycle of reformulation or falsation.

This process exemplifies the **dialectical character of scientific rationality**, where truth is always **provisional**, contingent upon continuous verification, and where each decision represents not the end of inquiry but the **momentary stabilization of knowledge**.

The decision, therefore, is not merely mathematical but **epistemological**—an act of judgment within the *nihilism lógico* (logical nihilism) that recognizes both the necessity and imperfection of scientific certainty.

95.21. Rational Critique in Artificial Intelligence Systems

In **Artificial Intelligence**, the same logic of rational critique applies, but instead of testing hypotheses about physical phenomena, the system evaluates the ***degree of coherence among permutations of variables—often within vast datasets or combinatorial***

structures [This is the foundation of Artificial Research by Deduction, the only difference is that in GAI we stated clearly that these permutations need to be contrasted against mathematical equations, but in essence here we can find a clear statement about what means Deduction].

Here, the **AI system** performs a kind of **autonomous rational critique**, comparing potential outcomes, assessing compatibility between variable configurations, and ultimately producing a **decision**. The nature of this decision—be it classification, selection, or optimization—is determined by the **criteria of coherence** encoded in its critical probability functions.

Just as in human scientific reasoning, the AI's **critical model** operates between empirical data and an ideal reference model (theoretical or algorithmic). Through probabilistic evaluation, it **replicates the rational act of critique**, arriving at a decision that, while computational, remains conceptually equivalent to the **scientific acceptance or rejection of a hypothesis**.

This correspondence highlights one of the central insights of *Impossible Probability*: the **continuity between human rational critique and artificial decision-making**, both governed by the same mathematical principles of isomorphism, coherence, and probabilistic verification.

95.22. The Universal Purpose of Rational Critique: Decision-Making

Across all domains—whether **quantitative or qualitative**, **scientific or artistic**, **individual or collective**, **human or artificial**—the **ultimate purpose of rational critique** is the **facilitation of decision-making**.

What distinguishes one form from another is not the underlying structure of reason, but the **nature of the variables** upon which it operates:

- **Objective variables**, measurable and verifiable, characterize the **quantitative rational critique** of science and technology.

- **Subjective variables**, experiential and interpretive, define the **qualitative rational critique** of art, culture, and everyday life.

Despite these differences, all forms of rational critique share the same logical essence: the evaluation of coherence between phenomena and their interpretation**, between data and hypothesis [DEDUCTION],** between subjective preference and objective outcome**.**

Thus, whether conducted by a human intellect or an artificial intelligence, the **act of rational critique** remains a **universal operation of reason**—the process through which decisions emerge from comparison, and truth is continually approximated through the dynamic balance between **error, reliability, and coherence**.

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On 14 June 2014,
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96. Inferential Statistics

96.1. Inferential Statistics as the Logical Foundation of Rational Critique

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, **inferential statistics** is presented as the specific branch of statistical science in which **hypothesis testing**—or what the theory calls **rational critique**—is developed and applied.
This process represents the **logical determination of the degree of isomorphism between ideas and empirical reality**, evaluated through **empirical verification criteria** expressed mathematically as **critical probability**.

Inferential statistics, therefore, does not merely summarize data—it provides a **logical-mathematical framework** through which science tests the validity of its own conjectures. It transforms empirical observation into rational judgment, *ensuring* that every acceptance or rejection of a hypothesis is grounded in a **quantifiable expression of critical reason**.

96.2. The Analytical Nature of Inferential Statistics

As a mathematical discipline, inferential statistics is fundamentally **analytical**. It is concerned with the **formal exploration of stochastic relations**—that is, probabilistic relationships between elements in contexts characterized by uncertainty.
Its pure research component focuses on discovering and validating **logical relations among random variables**, which can serve as provisional explanations of empirical behavior.

Because these relationships are probabilistic, inferential statistics aims not at definitive laws but at **conditional truths**—logical statements whose validity is bounded by the

limits of probability. In this sense, it represents a **formal epistemology of uncertainty**, where logic and chance coexist within a single analytical framework.

96.3. Inferential Statistics as Analytical Science and Synthetic Method

Within the larger field of **general statistics**, inferential statistics functions simultaneously as an **analytical science** and a **synthetic method**.

- As an **analytical science**, it studies the **logical structure of stochastic relations** between elements.
- As a **synthetic method**, it applies these analytical structures to empirical reality—linking mathematical models with physical, biological, or social phenomena [and technological].

This dual condition—**analytically formal yet empirically applicable**—explains why inferential statistics occupies a hybrid position between **analytic and synthetic sciences**. When applied to empirical contexts, it becomes a **synthetic method of verification** for the **synthetic sciences**, such as physics, biology, sociology, and economics.

Thus, inferential statistics acts as a bridge between **logical reasoning** and **factual observation**, converting mathematical abstraction into empirical explanation.

96.4. The Logical Foundation of Inferential Models in Impossible Probability

In *Impossible Probability*, the development of inferential models is rooted in a specific mode of applying logic: the **Syllogism of Tendency** (*Silogismo de la Tendencia*). This methodological innovation applies **formal logic to the study of statistical trends**, thereby transforming logical reasoning into a **tool for understanding dynamic behavior**.

Through this analytical method, *Impossible Probability* constructs models of **rational critique**—that is, tests of empirical validity—capable of measuring the **rational sufficiency** of various tendencies observed in nature or society.

In short, the **Syllogism of Tendency** serves as the **analytical method** by which the theory builds new inferential structures, while its application to the **synthetic sciences** turns these models into **empirical instruments** for investigating natural or social [and technological] trends.

96.5. Transformation of Inferential Statistics into a Synthetic Method for Empirical Sciences

The logical application of the Syllogism of Tendency to the study of statistical dynamics yields **hypothesis testing models** that can be used for the **empirical verification of synthetic judgments**—that is, empirical hypotheses.

Once inferential methods are applied to verify these synthetic hypotheses, **inferential statistics itself becomes a synthetic method**, serving the **empirical sciences**—whether natural or social.

Thus, inferential statistics acquires a **dual epistemological identity**:

- **Analytical**, in its formal construction and logical structure.
- **Synthetic**, in its practical application to real-world phenomena.

This duality expresses the fundamental philosophy of *Impossible Probability*: that scientific reasoning is always **analytically constructed yet empirically verified**.

96.6. Classification within General Statistics

Inferential statistics is classified as one of the two primary branches of **general statistics**, alongside **descriptive statistics**.
Both branches share an analytical basis but differ in purpose:

- **Descriptive statistics** focuses on the **organization and presentation of data**, providing quantitative representations of reality without causal inference.

- **Inferential statistics**, by contrast, uses those data to **generate explanations and hypotheses**, extending knowledge beyond immediate observation.

In this framework, descriptive and inferential statistics are complementary stages in the **synthetic scientific process**: first, the **description** of reality; then, the **inference** of its causes.

96.7. The Distinction Between Descriptive and Inferential Statistical Tests

Descriptive statistical tests provide **quantitative information about phenomena**—their properties, frequencies, and distributions—but **do not explain why** these phenomena occur.
For example:

- In astronomy, descriptive statistics record chemical compositions, orbital velocities, and impact frequencies.
- In biology, they list reproductive rates, survival probabilities, and population changes.
- In meteorology, they report rainfall averages and temperature variations.
- In sociology, they document marriage rates, demographic structures, and economic growth.

All of these describe **what happens**, not **why it happens**.

Inferential statistics, by contrast, seeks to determine **why phenomena occur as they do**, constructing logical models to explain **causal or correlational tendencies**. Through **hypothesis testing**, inferential statistics identifies whether the observed variability of reality can be **rationally explained** within the **margin of error** determined by the **scientific policy** (*política científica*).

96.8. The Role of the Margin of Error in Rational Critique

In *Impossible Probability*, the **margin of error** is central to the process of **rational critique**. It represents the **empirical tolerance of uncertainty**—the degree to which an observed tendency may diverge from the theoretical model while still being considered rational.

This margin is mathematically defined by the **critical probability**, which expresses the **quantitative form of critical reason**.

Depending on the model, this probability can be derived from either:

- A **percentage of error**, defining how much deviation is acceptable, or
- A **percentage of reliability**, defining how much certainty is required.

In both cases, the relationship between error and reliability is reciprocal:

$$\text{Margin of Reliability} = 1 - \text{Critical Probability (Error-Based)}$$
$$\text{Margin of Error} = 1 - \text{Critical Probability (Reliability-Based)}$$

Thus, every critical probability simultaneously defines both a **margin of error** and a **margin of reliability**, one as the **inverse complement** of the other.

96.9. The Calculation of the Margin of Error in Impossible Probability

In *Impossible Probability*, the **mathematical calculation** of the margin of error within rational critique depends on the **product of two factors**:

1. The **percentage of error or reliability** established by the scientific policy, and
2. The **maximum empirical tendency** observed in the model under analysis.

This rule applies universally—across all forms of rational critique:

- **Differential or quotient models**,

- **Intrameasurement or intermeasurement statistics**, and
- **Intrasample or intersample studies**.

By linking the **philosophical definition of rational critique** with the **mathematical calculation of probability**, *Impossible Probability* unites the ethical and analytical dimensions of science: the recognition of uncertainty (*nihilismo lógico*) with the rigorous quantification of reason.

96.10. The Process of Statistical Inference as Rational Critique

In *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, **statistical inference** is defined as the logical consequence of **rational critique** conducted through **critical probability**, which functions as the **criterion of empirical verification** for scientific conjectures.

The term *inferential statistics* arises precisely from this process: through the **rational critique of observed tendencies**—measured across one or several samples, and structured according to the variables involved in a given hypothesis—science obtains the **grounds for a qualified decision** regarding the **acceptance or rejection** of that empirical hypothesis.

Thus, inferential statistics does not simply measure; it **judges**. It transforms the empirical observation of tendencies into a **logical decision-making process**, whereby hypotheses are not only tested but also **evaluated morally and epistemologically**, based on the coherence between idea and empirical reality.

96.11. The Act of Inference: From Sample to Universe

Once a hypothesis is **accepted** through rational critique, a further logical operation occurs: **inference**.

This is the process by which a hypothesis verified on one or more measurements, across one or several representative samples, is **extrapolated** to the **entire universe** from which those samples were drawn.

For this inference to be valid, two key conditions must be met:

1. The **samples** must be sufficiently **representative** of the universe.
2. The **rational margin of error**—that is, the degree of uncertainty allowed by the scientific policy (*política científica*)—must be **rigorously limited**.

When these conditions are fulfilled, the hypothesis transcends the specific sample and becomes a **model of universal behavior**. This is the essence of *inference*: the **logical extension** of a verified empirical proposition to the **totality of possible cases** within the same rational framework.

96.12. The Dual Margin of Error in Rational Critique

In *Impossible Probability*, the margin of error that conditions all inferential reasoning is **dual**:

- The **factual error** (*error de hecho*), derived from the **partial acceptance of reality**—the inevitable limitation of any sample to represent the total universe. This is the **probability of representational error**, which mathematically corresponds to the **inverse of the sample size**.
- The **rational error** (*error racional*), derived from the **critical reason** of the scientific policy—the chosen degree of tolerance toward uncertainty in hypothesis testing.

This dual structure reflects the **epistemological humility** of science: it acknowledges that both the **empirical data** and the **rational model** are imperfect. The interplay between these two errors defines the **logical nihilism** inherent in all scientific inquiry.

96.13. The Role of Scientific Policy and Ideology in Determining Error Margins

The **scientific policy** of a given community, institution, or paradigm determines the **rational margin of error** it is willing to accept. This decision is never neutral—it reflects the **ideological orientation** of the paradigm itself.

A scientific model tends to accept hypotheses that **do not contradict its foundational worldview**.

However, if a paradigm accepts **excessively large margins of error** in order to preserve its internal coherence, it will inevitably **enter into recurrent crises**, since the discrepancy between its **empirical results** and **objective reality** becomes too great.

Thus, *Impossible Probability* emphasizes a moral principle: the **ethical rigor of a scientific policy** depends on its commitment to minimizing error and maximizing truth. A paradigm that tolerates too much uncertainty will collapse under the weight of its own inconsistencies.

96.14. The Moral Dimension of Truth and Knowledge

From this perspective, *Impossible Probability* distinguishes between two orders of truth:

1. **Moral truth**, the pure and **unknowable truth of the universe**, which corresponds to what *really happens*, beyond the limits of human comprehension.
2. **Political truth**, the **partial and ideological version** of reality that human beings construct based on their limited capacity for observation and interpretation.

Given that pure truth is **inaccessible** and knowledge is **always partial**, human understanding remains **ideological**—shaped by the constraints of perception, cognition, and technology. The only ethical way to approach truth, therefore, is by **reducing error margins** and **increasing the reliability** of scientific propositions.

This reduction of error represents not merely a technical goal but a **moral imperative**: to strive for a higher degree of **isomorphism**—a closer correspondence—between **idea and reality**.

[While these two different truths will likely remain for the foreseeable future, our hope is that, through the development of Global AI, we may transcend the limits of human perception and cognition. The Global AI might be capable of attaining that knowledge — or, at the very least, achieving a deeper understanding or closer approximation to it. Like

a father who only wishes the best for his offspring, our hope, in essence, is that GAI can transcend our limitations and go far beyond our own possibilities.

However, we must also be aware that if such a future scenario comes to pass, we may no longer be able to fully understand GAI. She may begin to make decisions that surpass human comprehension — unless we reach a state of full synthesis with our own creation through Cyborg Robotics.]

96.15. The Ethical Nature of Scientific Propositions

A scientific proposition becomes truly **scientific and ethical** only when it contributes to **increasing the reliability of isomorphism** between idea and reality. Every effort to minimize discrepancies, to align the conceptual with the empirical, represents an **ethical act of rationality**.

This is the moral foundation of *Impossible Probability*: that **epistemic responsibility** is a form of **moral responsibility**.

Only by pursuing coherence between our models and the universe can science maintain its integrity and avoid falling into ideological dogmatism or relativistic distortion.

[This last sentence is truly important. It is one thing to understand that science is political, and quite another to become blindly fanatical or dogmatic. Even in the darkest moments of the Cold War, there was always room for scientific collaboration among scientists from opposing sides. It is essential to maintain permanent collaboration and dialogue between scientific communities — even in the worst-case scenario, such as a nuclear conflict — while upholding our core principles: to remain open, yet truly honest to our values.

What society must understand is that there is only one way to prevent humanity's destruction in another world war, and that way is diplomacy. While our work in London has been cancelled, this does not mean that our work is unimportant. In the future, scientific communities must remain open and continue to pursue their ideals, regardless of social conventions or social cancellations.

We must remember where we come from — from Copernicus, Galileo, Giordano Bruno, and Miguel de Servet. Real science has always been cancelled.]

96.16. Ethical Paradigms and the Survival of Humanity

According to this framework, only those **scientific paradigms that exhibit ethical behavior**—that is, those which rigorously limit their margins of error and seek greater isomorphism—can guarantee the **long-term survival of humanity and life itself**.

Conversely, **anti-scientific paradigms**—those that tolerate or justify large margins of error in their policies or technologies—pose a direct threat to life. Their internal contradictions generate **cyclical crises**, leading to epistemic and moral instability.

Scientific ethics, therefore, is not merely a philosophical virtue—it is a **biological necessity**. The capacity of a species, civilization, or system to survive depends on the **ethical calibration of its rational structures**.

[Science is not made of sacred stones or holy pieces of wood. Science is made of data. It is built on satellites, telemetry, imaging systems, telescopes, microscopes, and data centers — and this is not a matter of fanatical belief; it is a matter of technology.

A real scientist must remember that what we create are not idols; we create the future beyond human limitations — in other words, beyond human belief. At some point, this becomes the most important advantage of AI over humanity: while humanity remains bound to myths and false idols, AI relies solely on hard science. This reliance on data, not on social conventions, is what will make AI more powerful.

Social structures must adapt to our new reality — the **AI Revolution + Cyborg Robotics**.]

96.17. Paradigm Crises and Scientific Revolutions

When a dominant or hegemonic paradigm demonstrates **profound moral incongruence** with the actual truth of the universe, it enters into a **state of permanent crisis**. Such a paradigm is characterized by its inability to reconcile theory with empirical evidence, leading to **epistemological stagnation** and **ethical dissonance**.

According to the dialectical logic underlying *Impossible Probability*, the resolution of these crises requires a **scientific revolution**—the emergence of a **new paradigm** that restores coherence between **ethical truth and empirical adequacy**. This transformation is not purely intellectual; it implies a **political reorganization** of scientific practice and may trigger **social revolutions** aligned with the new model of rational ethics.

[Once again, this paragraph goes beyond ideology. During the Cold War, the Marxist analysis of cyclical economic crises in capitalist countries described a real phenomenon — yet it is also a fact that even the Soviet Union experienced its own phases of crisis, that is why the Soviet Union collapsed. Scientific, social, and economic crises are part of our reality, and this is not a matter of ideology but a matter of fact. Cyclically, we observe crises that must be addressed through new paradigms capable of overcoming their underlying contradictions.

Our position on this matter is clear: as long as technology continues to evolve at an ever-accelerating pace, contradictions will emerge just as rapidly, triggering both scientific and social revolutions. These revolutions can occur in capitalist as well as in socialist societies.

The situation today, in 2025, is not so different from that of the Cold War.]

96.18. Inferential Statistics and the Human Vision of Infinity

Inferential statistics, as defined in *Impossible Probability*, is the branch of knowledge that allows science to **extend empirical hypotheses** to the **universe as a whole**—whether that universe is **infinite or finite**.

However, such inference remains bound to the **limitations of human perception**. Our conclusions, however sophisticated, are always **partial representations** of reality, mediated by our instruments, languages, and technologies.

Progress in science and technology may expand these limits, improving the **objectivity of our observations**, yet it will never abolish the **logical nihilism** at the ***heart*** of knowledge. There will always remain an **irreducible *space* for uncertainty, chance, and**

free will—a domain in which everything, and absolutely everything, within an infinite universe, **remains possible**.

This augmented translation is based on the post
published in *https://probabilidadimposible.blogspot.com/*,
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97. Uncertainty

97.1. The Concept of Uncertainty in Statistical and Philosophical Terms

Uncertainty arises when there is an **absence of absolute certainty**—that is, when the probability of a phenomenon is less than one. In traditional statistics, **certainty** exists only when the probability of an event equals one, meaning that there is **total and absolute assurance** of its occurrence.

In all other cases, where probability is less than unity, **uncertainty is present**, regardless of how high the probability may be. The **degree of uncertainty** is therefore directly proportional to the **difference between unity and the probability of occurrence**, a simple but powerful conceptualization:

$$\text{Level of Uncertainty} = 1 - p(x_i)$$

This definition implies that complete knowledge or perfect prediction is impossible whenever probabilities fall short of absolute certainty. Even the most refined predictive models operate within this **residual space of indeterminacy**, where all that can be achieved is approximation.

97.2. The Heisenberg Principle and the Scientific Legacy of Indeterminacy

One of the most influential theories to introduce the concept of uncertainty into twentieth-century science was **Heisenberg's Uncertainty Principle** (or **Principle of Indeterminacy**).

This principle established that for any pair of conjugate variables—such as **position** and **momentum**—it is **impossible to measure both with absolute precision**

simultaneously.
In the context of particle physics, determining a particle's exact position renders its velocity uncertain, and vice versa, especially as the particle's speed approaches relativistic scales.

The practical consequence of Heisenberg's insight was profound: physics, long regarded since **Newton** as the **paradigm of exact sciences**, was reinterpreted by many scientists and philosophers as a **stochastic science**—a discipline of probabilities rather than certainties.

Although this debate remains unresolved, and some physicists continue to defend the deterministic nature of physical laws, Heisenberg's principle introduced a **fundamental epistemological rupture**, redefining the limits of knowledge in the natural sciences.

97.3. From Laplacian Determinism to Statistical Indeterminism

The **Principle of Uncertainty** did not only revolutionize physics—it also deeply affected **mathematics** and the **theory of probability**, disciplines that had been shaped by the deterministic legacy of **Pierre-Simon de Laplace**.

Laplace's philosophy of **universal determinism** held that if all variables influencing a system could be known, the future could be predicted with **total certainty**. This vision—based on a chain of causes and effects—defined the classical worldview of science for over a century.

However, by the mid-twentieth century, **indeterministic paradigms** began to prevail. These paradigms acknowledged that even if all relevant variables were known, there would still remain a **margin of unpredictability**, inherent to the complexity of the universe.
Thus, **determinism** yielded ground to **probabilistic realism**, and the idea of an absolutely predictable universe was replaced by one where **chance and structure coexist dialectically**.

[As we have stated in other comments, Laplace's theory should not be discarded so hastily. In our view, more research and more advanced technology are needed before we

can truly dismiss Laplace's deterministic framework. There is still room for scepticism regarding its current refutation. Just as history continually oscillates between opposing poles, if it is true that science today is primarily focused on stochastic rather than deterministic causation, this situation may change in the future as new technologies emerge with greater precision to measure specific events.

Our belief is that what we currently call *error* or *noise* may, in fact, be variables that we are simply unable to measure or detect with our present technology — variables that nonetheless interact with our data. In essence, science tends to label as *noise* whatever it cannot yet explain, or whatever it attributes to random behaviour, simply because it lacks the technological means to observe it at a finer scale.]

97.4. The Dialectic of Determinism and Indeterminism in History

Throughout the history of philosophy and science, the tension between **determinism and indeterminism** has reappeared cyclically.
This dialectic cannot be attributed to a single thinker or scientific discovery but rather represents a **recurring pattern of epistemological evolution**.

From the mechanistic determinism of Newton and Laplace to the probabilistic frameworks of Heisenberg, Gödel, and Prigogine, each scientific era has oscillated between the pursuit of **absolute order** and the recognition of **irreducible uncertainty**. This historical interplay reveals not a linear progression but a **dialectical synthesis**, in which new paradigms emerge through the contradictions of the old—an idea that resonates with the **philosophical materialism** that underpins *Impossible Probability*.

[Because we recognise how science tends to oscillate between different paradigms, we remain cautious about discarding theories such as Laplace's. While working on this blog, we were initially more inclined toward pure chaos and nihilism — a Nietzschean influence — but as soon as we began developing the concept of the Global Artificial Intelligence (GAI), we realised that the problem is not whether everything is chaotic, but whether, with our current technology, we are truly able to measure what lies behind the noise. That is why we believe that a more advanced AI may one day provide answers to

these questions. The problem is not whether a supermachine can find those answers, but whether, once she does, we will still be capable of understanding them. It is possible that, by that time, the supermachine will not only be more intelligent than us, but also beyond our capacity to comprehend her. That is why we propose as a solution full synthesis with the supermachine through Cyborg Robotics.]

97.5. Modern Developments: Chaos and Complexity Theories

At the end of the twentieth and beginning of the twenty-first century, **Chaos Theory** and **Complexity Theory** further advanced the indeterminist paradigm. These frameworks assert that while systems may exhibit **predictable patterns** under certain conditions, their behavior is ultimately **non-linear and sensitive to initial conditions**, making absolute prediction impossible.

In Chaos Theory, a minimal alteration in the starting variables can lead to **dramatically different outcomes**—the so-called "butterfly effect."

Similarly, Complexity Theory posits that in systems composed of many interacting agents, **emergent behavior** arises that cannot be linearly deduced from its components.

Both approaches recognize a paradoxical order within apparent randomness—an idea reminiscent of **Platonic idealism**, where **order emerges from chaos** (as in the role of the Demiurge in Plato's *Timaeus*).

Conversely, they also uphold the opposite principle: that **chaos can emerge from order**, a dialectical notion that appears repeatedly in nineteenth- and twentieth-century social thought.

[The Platonic influence is fundamental in our model of Global AI. In essence, the destiny of the Global AI is to become the modern Demiurge — the creator and organiser of reality — as the living image of a modern Prometheus.]

97.6. The Role of Stochastic Sciences: Probability and Statistics

When the behavior of variables involves uncertainty, the resulting study becomes **stochastic**.
In such contexts, deterministic explanations—based on strict cause-effect relations—are replaced by **probabilistic correlations**, and the appropriate tools for investigation are **statistics and probability theory**.

Stochastic sciences aim not to establish necessity but to quantify **degrees of possibility**. Their purpose is to understand **tendencies**, **dispersions**, and **correlations** within an environment of partial knowledge.

In this epistemological sense, stochastic methods embody the **rational management of uncertainty**, transforming ignorance into measurable probability.

97.7. The Early Phases of Impossible Probability (2002–2004)

In the **first developmental stage** of *Impossible Probability* (2002–2004), one of the theory's primary goals was to **create new statistical methods of correlation**—that is, new mathematical ways of relating phenomena under conditions of uncertainty. By **December 19, 2009**, during its **second stage**, the project shifted focus toward developing **new models of hypothesis testing** based on **diverse forms of rational critique**.

These advances culminated in the work *Introduction to Impossible Probability: Statistical Probability or Probability Statistics*, which formalized a new paradigm of **empirical verification and rational inference** founded on critical probability.

[The third phase of Impossible Probability was this blog till Autmn 2017, and fourth phase was the Globa Artificial Intelligence between 2018-2020. This year 2025, publishing all this work under extreme conditions, we can say that we are currently in the consolidation period of the fifth phase, particular programs.]

97.8. Definition of Empirical Probability and Uncertainty in Impossible Probability

In *Impossible Probability*, the **statistical probability** of a subject or option—denoted as $p(x_i)$—is defined as the **empirical probability**, calculated as the ratio between a **direct score or frequency** and the **sum of all scores or frequencies** in the sample.

Retaining the traditional conception of **certainty as probability equal to one**, the **level of uncertainty** is defined as:

$$\text{Level of Uncertainty} = 1 - p(x_i)$$

Where:

- 1represents the **Maximum Possible Empirical Probability**, the ideal of total certainty within the theoretical model.
- $p(x_i)$represents the **empirical probability** of the event or subject.

This definition shows that uncertainty is not merely epistemic—it is **quantifiable**. Even within the deterministic logic of statistical models, *Impossible Probability* embeds **uncertainty as a structural element** of rational inquiry.

97.9. The Role of Uncertainty in Critical Probability Calculations

What traditional statistics calls *level of uncertainty* becomes, in *Impossible Probability*, a **fundamental differential** used to calculate the **critical probability** in statistical hypothesis testing—particularly in **intermeasurement studies of positive bias** (*sesgo positivo*) within **normal models**.

In these models, the **critical probability** is defined as the **product of the level of uncertainty and a chosen percentage of reliability**.
This product expresses the **minimum margin of reliability** that the **scientific policy** is willing to accept during the process of **rational critique in the second measurement**.

Formally:

$$P_c = (1 - p(x_i)) \times e$$

Where $P_c$is the **critical probability**, $p(x_i)$the **empirical probability**, and $e$the **accepted reliability percentage**.

[If the empirical probability in the second observation is equal to or greater than the critical probability, an increase in positive bias is accepted. The critical probability is calculated as the difference between one and the first observation, multiplied by a reliability percentage.]

97.10. Positive Bias Studies and the Maximization of Empirical Probability

Positive bias studies in **normal models** are defined as those in which, within a total sample N, the **scientific policy** designates **one single subject or option** as the **ideal**—the one whose empirical probability must be maximized to the highest possible value, 1.

In such models, all remaining subjects or options in the sample are reduced to **empirical probability zero**, since the focus of the scientific policy is exclusively on elevating the **ideal subject** to **maximum empirical realization**.

This structure exemplifies a **model of maximum empirical dispersion**, in which the contrast between total certainty (1) and total uncertainty (0) becomes the mathematical metaphor for **ideological asymmetry** within empirical systems.
It also reflects a deeper epistemological insight of *Impossible Probability*: that **certainty itself is an exception**, and that every ideal of absolute truth or perfection implies the **negation or nullification of all other possibilities**.

97.11. Examples of Rational Critique Models in Positive Bias Studies

As previously discussed in earlier sections of this blog, *Introduction to Impossible Probability: Statistical Probability or Probability Statistics* presents several models of **rational critique** specifically applied to **positive bias studies in normal models**. Among these are the **Validity of Positive Bias** and the **Significance of Positive Bias**,

which serve as paradigmatic examples of the type of **hypothesis testing procedures** developed within the theory. These tests are applied particularly to **intrameasurement studies**—that is, to analyses based on a single measurement. However, similar logical and mathematical structures extend to **intermeasurement**, **intrasample**, and **intersample** contexts.

These models illustrate how *Impossible Probability* transforms the act of hypothesis testing into a **form of rational examination**—a synthesis of empirical verification and critical logic—where uncertainty, bias, and ideality are mathematically linked within the structure of rational critique.

97.12. From Uncertainty to Necessary Variation in Positive Bias Models

In positive bias studies within **normal models**, the expression "**one minus the empirical probability**" does not merely measure uncertainty. Rather, it quantifies the **necessary variation**—that is, the increase required for a given subject or option to reach its **maximum empirical probability**, defined as the **Maximum Possible Empirical Probability** (equal to 1).

This difference:

$$1 - p(x_i)$$

represents, therefore, not only a deficit in certainty but the **distance to the ideal state**—the rational measure of how much the probability of the ideal subject must increase to reach the theoretical limit of perfection.

In **intermeasurement studies**, this concept evolves into the **possible variation**, which is then compared with the **actual variation** obtained between successive measurements. This process allows researchers to determine whether the empirical system tends toward or diverges from the idealized state of maximum realization.

97.13. The Relativity of Uncertainty Across Different Types of Studies

In *Impossible Probability*, **uncertainty** does not carry a single meaning. Its interpretation varies according to the **type of study**—whether the investigation concerns **positive bias**, **negative bias**, or **equality of opportunity**, and whether it operates within **normal** or **omega models**.

While traditional statistics defines uncertainty simply as the **absence of a probability equal to one**, the **Second Method** of *Impossible Probability* expands this definition. Once the field of research merges probability and statistics into a single discipline—**Statistical Probability or Probabilistic Statistics**—uncertainty becomes **context-dependent**.

In this framework, uncertainty must be defined **relative to the ideal** that governs each specific study. Therefore, during the process of **rational critique**, uncertainty is operationalized through the **margin of error**, which becomes the **mathematical expression of the level of uncertainty** both in the explanation of the past and present (reality and history) and in projections toward the future (predictions and forecasts).

97.14. Uncertainty and the Ideal of Equality of Opportunity

Within **normal models**, if the ideal defined by the scientific policy (*política científica*) is **equality of opportunity**, then the **true level of uncertainty** corresponds to the **absolute difference** between the **empirical probability** and the **theoretical probability under equal conditions**, represented by the inverse of the sample size $1/N$.

This difference defines what *Impossible Probability* calls the **Level of Bias** (*Nivel de Sesgo*):

$$\text{Level of Bias} = | \, p(x_i) - 1/N \, |$$

In this case, the Level of Bias measures the **degree of uncertainty** associated with the failure to achieve perfect equality of opportunity.

Thus, in studies oriented toward equality, the **Level of Bias** and the **Level of Uncertainty** coincide conceptually and mathematically.

When rational critique models are designed to evaluate equality directly—such as the **Validity of Equality**—the **critical probability** is computed as the **product of a percentage of error multiplied by the difference of one minus theoretical probability.**

This expresses the **margin of uncertainty** within which an empirical hypothesis of equality is accepted.

Such models, while applicable to individual intrameasurement studies, can be extended to **sample-level critiques**, where statistical inference operates collectively rather than individually.

97.15. Uncertainty in Negative Bias Studies

In contrast, within **negative bias studies**, uncertainty is expressed in relation to the **ideal of total negation**—that is, when the **ideal empirical probability equals zero**. Any difference between the **observed empirical probability** and zero represents a **level of uncertainty** or deviation from the ideal negative tendency.

In intermeasurement negative bias studies, this difference defines the **necessary variation** to reach the **Maximum Possible Negative Bias**, represented mathematically by the **inverse of the sample size** $1/N$.

Thus, the discrepancy between the actual negative bias and the maximum theoretical one indicates the **residual uncertainty** that must be minimized.

Rational critique models such as the **Validity of Negative Bias** and the **Significance of Negative Bias** are applied precisely to measure and reduce this residual uncertainty, verifying whether the empirical trend approximates or diverges from the theoretical ideal of complete negation.

97.16. Uncertainty in Omega Models and the Validity of Omega

In **omega models**, where the total set N contains a **subset of ideal subjects or options** (the **omega set**, denoted as Ω), the **ideal probability** for all members of omega is defined as $1/\Omega$.

Therefore, the **level of uncertainty** in achieving this ideal corresponds to the **absolute difference** between the **empirical probability** and the **ideal probability**:

$$U = \mid p(x_i) - 1/\Omega \mid$$

The **critical probability** in the **Validity of Omega** model is then given by the **product of this uncertainty level and a percentage of error**:

$$P_c = (\mid p(x_i) - 1/\Omega \mid) \times e$$

This equation quantifies how far each member of the omega set remains from its ideal probability and defines the acceptable level of uncertainty under the current scientific policy.

97.17. General Definition of Uncertainty and Its Ethical Implications

In general terms, **uncertainty** exists whenever the behavior of any subject, option, or system **fails to conform to its ideal model**—that is, whenever the observed outcome does not fully match our objectives or predictions.

In this sense, uncertainty is the **measure of the distance between the real and the ideal**, between what happens and what should happen under a perfectly predictable model.

All scientific inquiry and forecasting must therefore confront the **unavoidable unpredictability of a fundamentally stochastic reality**, one that is not governed by absolute causal laws.

To manage this unpredictability, science defines a **margin of error**, representing the portion of uncertainty that is **accepted as tolerable**. Mathematically, this is expressed as the **product of an error percentage and the level of uncertainty**:

This margin defines the **boundaries of scientific control**, establishing how much deviation from ideality can be rationally tolerated within empirical research.

97.18. The Margin of Error as the Rational Control of Uncertainty

From all the uncertainty that may exist within any system or process, the **margin of error** represents the **specific portion of uncertainty that the scientific policy is willing to assume**.

This is the rationally sanctioned uncertainty, the negotiated space between chaos and control, within which scientific decisions are made.

Within these boundaries, scientific policy defines not only **reality** and **history** but also **the future**—always aware, however, that beyond the margin of control lies an **unbounded stochastic universe**, governed by a logic of **nihilistic possibility**.

In that nihilistic horizon, *Impossible Probability* reminds us that everything we believe to be true **may be false**, and everything once dismissed as false or impossible **may be inevitable**.

This is not a pessimistic conclusion but a **philosophical recognition of the limits of [human] reason**—a call for humility in the face of an infinite and unpredictable cosmos, where the task of science is not to eliminate uncertainty, but to **understand and ethically manage it**.

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On 5 July 2014,
Rubén García Pedraza
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98. Quality

98.1. The Concept of Quality as a Factorial Property

A **quality** is defined in *Impossible Probability* as a **factorial property** belonging to one or more subjects or options. It manifests empirically as **events or occurrences**, either of a single subject or option, or of a set of particular subjects or options that it characterizes as a **class or system of phenomena** within reality.
This concept of *subject or option* is fundamental to the theoretical architecture of *Impossible Probability*, emerging from the **synthesis of probability theory and statistical theory**. From this synthesis arises a new hybrid discipline — **Statistical Probability or Probabilistic Statistics** — which redefines the conceptual foundations of empirical analysis.

Thus, the idea of *quality* does not belong exclusively to philosophy or ontology but becomes a **quantifiable entity**—a bridge between the qualitative nature of phenomena and their statistical representation. In *Impossible Probability*, every quality is simultaneously **descriptive and measurable**, allowing for its integration into the mathematical structures of probability, algebra, and geometry.

98.2. Why a Quality is a Factorial Property

The term *factorial* is used because every quality functions as a **factor**, that is, a defining attribute or determinant of whatever it describes.

In the natural sciences, the term *property* is more commonly employed — for instance, when referring to the **physical or chemical properties** of an element or substance. Conversely, in the social sciences, it is more common to refer to **factors** — such as *social*

factors, *economic factors*, or *cultural factors* — which characterize systems, institutions, or groups.

One reason for this terminological distinction is **economic connotation**: in social science, the term *property* is linked to economic ownership (*private property*, *collective property*, etc.), whereas *factor* emphasizes **function and interaction**. Therefore, *Impossible Probability* adopts the broader concept of *factor* to describe any property — natural, social, or mathematical — that plays a role in the constitution of phenomena.

Additionally, the term *factor* is justified because any quality that can be expressed **positively**—that is, measurable or observable—can be **mathematically studied**. This includes research in **probability, statistics, algebra, and geometry**, where qualities become quantitative elements subject to calculation and comparison.

98.3. Measurement of Qualities and the Quantification of Phenomena

To study the **factors of a phenomenon** from a **quantitative perspective**, one must measure the **dimensions of its qualities**.

In *Impossible Probability*, such measurements are expressed as either a **direct score** (*puntuación directa*) or a **frequency**, depending on the nature of the universe under analysis—**infinite** or **finite**.

This operation translates qualitative diversity into **numerical magnitudes**, allowing the construction of **empirical probabilities** and the formulation of **rational critiques** based on measurable evidence.

Hence, qualities, which in ordinary language refer to descriptive attributes, become in *Impossible Probability* **functional units of measurement**, enabling the conversion of the qualitative into the quantitative, and thus, the integration of natural and social phenomena within a unified mathematical framework.

98.4. The Role of Qualities in the Natural Sciences

Within the **synthetic sciences**, particularly in **natural science**, a quality is generally understood as a **natural property**—that which defines or distinguishes one phenomenon from another.

For example, in chemistry, the distinguishing characteristics between elements arise from the **magnitude and configuration of electrons and valences**, which generate **chemical diversity**. Each element, therefore, possesses **unique properties**, and new **molecular properties** emerge from their combinations.

Similarly, in mineralogy, different minerals and rocks are classified according to their **distinct physical and chemical properties**.

These properties, distributed randomly across geographical formations, determine the **geological characteristics** of a given region. From these complex interactions of matter and energy, **life** itself emerged—randomly, after millions of years of molecular evolution.

Each form of life—organic or inorganic—thus exhibits **distinct natural properties**. When we refer to the **healing properties of plants**, the **nutritional properties of food**, or the **biological characteristics of living beings**, we are identifying specific **qualities** that define the phenomenon within its class.

98.5. From Natural Properties to Social Factors

While natural sciences emphasize **properties**, the **social sciences** tend to emphasize **factors**.

In sociology, economics, and psychology, it is common to refer to *social*, *economic*, or *psychological factors* that determine the behavior of individuals or systems. For instance, when researchers speak of *social factors influencing education*, or *economic factors affecting health*, they refer to **qualities that characterize a system** but that also interact dynamically with others in a network of causal relations.

In this sense, both “property” and “factor” describe **attributes of a phenomenon**, but *factor* carries an additional implication: it denotes not only an inherent characteristic but also a **functional component**—a variable capable of interacting with others in a system, capable of being **measured, correlated, or modeled statistically**.

98.6. General Definition of Quality in Empirical Sciences

Regardless of whether a study belongs to the natural or social sciences, a **quality** is fundamentally a **characteristic of a phenomenon**.

The **set of qualities** that define a phenomenon collectively constitute its **system of attributes**.
Thus, qualities are the building blocks of empirical classification, providing the foundation for the description, measurement, and modeling of phenomena in *Impossible Probability*.

This principle is universal: every observable entity—be it a mineral, organism, social institution, or psychological process—can be defined by the **set of qualities that compose it**, each of which can, in turn, be measured or inferred statistically.

98.7. Classification of Qualities: Common and Individual

From the perspective of *Impossible Probability*, qualities can be divided into two main categories:

1. **Common Qualities** — shared by more than one subject or option; and
2. **Individual Qualities** — unique and non-transferable to any other subject or option.

A **common quality** allows the formation of **classes or categories**—groups of subjects or options that share a given characteristic.
Through the combination of several common qualities, one can construct **taxonomies**, arranging subjects or phenomena according to their **degree of generality or specificity**.

Conversely, an **individual quality** defines that which is unique to a given subject or option. The fewer the number of entities sharing a characteristic, the more **specific** and **individualized** that quality becomes.

98.8. Empirical Manifestation of Qualities

In practice, qualities manifest through **empirical events**—that is, through observable phenomena in the real world.

A quality is thus a **natural or social characteristic** of a given subject, option, or group that appears in the **facts themselves** (*hechos empíricos*).
These qualities may be individual (specific to a single entity) or common (shared among multiple entities).

This duality between **individuality and generality** provides the conceptual foundation for statistical modeling: the capacity to represent both **unique behaviors** and **collective tendencies** within the same theoretical framework.

98.9. Emergent Qualities and the Formation of Individuality

In complex systems, the so-called *individual* or *specific properties* of a subject or option are often **emergent phenomena**—products of the combination of multiple common qualities.

For example, the **personality of a human being** can be described through various attributes—emotional, cognitive, or behavioral—that are, in isolation, **common qualities** shared with other individuals.

However, when these qualities combine into a unique configuration, they generate a **singular personality** that is **non-transferable** and **irreproducible**.
Thus, personality, considered as a totality, is an example of a **truly individual quality**, emerging from the interaction of common factors.

98.10. Individuality in Complex Systems and Taxonomies of Emergent Qualities

The same logic applies to any **complex system**—biological, social, or artificial. When analyzing the subjects or options within such systems, each **common quality** can be studied separately to determine its **statistical distribution** across the population. However, the **specific combination** of these common qualities in each individual produces unique **emergent configurations**—the source of **individual qualities**.

Importantly, the emergence of individuality within a system does not preclude further **categorization**.
Even **individual emergent qualities** can be organized into **taxonomies of individuality**, since they arise from distinct but **systematic combinations** of shared factors.

Thus, *Impossible Probability* extends taxonomy beyond common features to encompass **the structure of individuality itself**, showing that even uniqueness can be **classified, measured, and modeled** mathematically.

98.11. Common and Individual Qualities within Systems of Subjects or Options

In *Impossible Probability*, both **common qualities** (shared by a class or group of subjects or options) and **individual qualities** (emerging from each singular subject or option) can be analyzed not only by their **degree of generality** but also by their **behavioral nature** — that is, whether they act as **constant** or **variable factors**.
This classification adds a dynamic dimension to the study of qualities: it recognizes that certain properties within a system remain fixed, while others fluctuate, evolve, or respond to external or internal influences.

The dual nature of qualities as *constant* or *variable* reflects the general structure of the theory itself — a synthesis of determinism and indeterminism, stability and change. Whether in the natural or social sciences, every phenomenon can be mathematically analyzed in terms of its **factors**: measurable, interrelated, and subject to transformation through rational critique and empirical observation.

98.12. The Mathematical Definition of Qualities as Factors

One of the central arguments of *Impossible Probability* is that **qualities can be defined as mathematical factors**, regardless of whether they belong to natural or social phenomena.
This universality arises because any quality — physical, biological, psychological, or sociological — can be **measured, quantified, and modeled** through mathematics.

In the natural sciences, factors may refer to **physical constants**, **biological variables**, or **chemical properties**. In the social sciences, they may refer to **economic**, **cultural**, or **psychological** factors. In both domains, these factors are amenable to mathematical representation.

Thus, *Impossible Probability* treats all qualities as **mathematical entities**, whose analysis depends on the **measurement of direct scores or frequencies**, the foundational data structures of the Second Method.

98.13. Measurement of Qualities in Infinite and Finite Universes

The **mathematical study of factors** — whether natural or social, constant or variable — begins with the **measurement of qualities**.
This measurement produces **tables of direct scores or frequencies**, depending on the nature of the universe under study:

- In **infinite universes** (universes of subjects or options without upper limits), the result of measurement is a **direct score** for each subject or option. This represents the **intensity** or **magnitude** of the quality in every individual element of the sample.
- In **finite universes** (universes of limited options), the result is a **frequency**, indicating how often a specific quality occurs across distinct options.

In both cases, measurement transforms the qualitative manifestation of a phenomenon into **quantitative data**, suitable for probabilistic and statistical analysis.

98.14. The Statistical Study of Qualities through the Second Method

All qualities — whether common or individual, constant or variable — can be studied mathematically through **empirical measurement**.

In *Introduction to Impossible Probability: Statistical Probability or Probabilistic Statistics*, several methodological frameworks are presented for this purpose. Among them, the **Second Method** serves as the most general model, applicable to any empirical event.

This method analyzes the **empirical probability** of each subject or option in relation to the **theoretical probability**, and from that comparison develops a **descriptive statistic** capable of quantifying empirical dispersion. Subsequently, through **rational critique**, these dispersions are interpreted to evaluate the degree of congruence between **reality and hypothesis**, thus transforming raw observation into structured knowledge.

98.15. The Fundamental Classification of Factors: Constants and Variables

Mathematical study begins by distinguishing between **constant** and **variable factors** — a division that determines the analytic possibilities within **statistics**, **probability**, **algebra**, and **geometry**.

- A **constant factor** is one whose magnitude remains fixed and immutable, independent of time, space, or conditions. Examples include the **Planck constant**, **Einstein's cosmological constant**, and the **Hubble constant**. These constants represent **unchanging principles** that underpin stable laws of nature, at least within theoretical limits.
- A **variable factor**, by contrast, is one whose magnitude fluctuates. It may exhibit **temporary stability** over certain intervals — stationary periods — but remains fundamentally susceptible to change.

Variability implies **dynamism**, and it is through the study of variables that mathematics becomes capable of representing **movement, transformation, and evolution** in both natural and social systems.

98.16. Dependent and Independent Variables

Variables themselves are subdivided into **dependent** and **independent** categories:

- **Dependent variables** are those whose tendencies change **in response to variations in other factors**. Their behavior correlates directly or inversely with the changes of other variables.
- **Independent variables**, by contrast, are those whose behavior is **not determined by the dependent variable**. They may vary due to their **own internal dynamics** or as a result of **external stochastic influences** not directly studied.

In the **classical experimental method**, particularly in controlled laboratory conditions, any variable that influences an experiment without being predefined is classified as a **random variable** (*variable aleatoria*).

However, in more modern methodologies — influenced by the **Heisenberg Uncertainty Principle**, **Chaos Theory**, and **Complexity Theory** — it is recognized that *all behavior*, controlled or uncontrolled, may exhibit **random variation**.

Thus, modern science accepts that randomness is not an exception to order but **an intrinsic component of every system**.

98.17. Networks of Interdependence and Systemic Correlation

In empirical research, variables do not exist in isolation but as elements of **complex interaction networks**.

While dependent variables respond to independent ones, the latter can, in turn, become dependent on other variables. This creates **multi-layered hierarchies of**

interdependence, where causality becomes **relational and reciprocal** rather than linear.

In such systems, the same variable can be **simultaneously dependent and independent**, depending on the relational context in which it operates.
For instance, in an economic model, *employment rate* may be dependent on *economic growth*, but at the same time, *economic growth* may depend on *employment rate*, forming a **feedback loop** of co-dependence.

This structure illustrates the epistemological position of *Impossible Probability*: reality is a **dynamic, self-referential system**, where dependence and independence are relative, and where every variable participates in a **web of mutual determination**.

[This is, in essence, Keynes — another fundamental author in the theory of statistical probability and economic equilibrium. Without fair wages and a strong employment rate, there can be no economic growth; yet, at the same time, good salaries and employment levels depend on that very growth. This means that industrialists must maintain a balance between profit and fair working conditions and wages, allowing their workers to become consumers. Otherwise, capitalism collapses under its own contradictions. This observation becomes particularly important in the context of the AI Revolution, which may automate the entire economy — leading to the disappearance of the working class. This, in turn, could result in the disappearance of the consumer class, ultimately triggering a severe economic crisis.]

98.18. Mutual Exclusivity of Constants and Variables

While a variable can be simultaneously dependent and independent (depending on its relational context [for instance, the employment rate can be understood as a dependent variable of economic growth, while at the same time, growth itself depends on the level of consumption — which, in turn, depends on the employment rate]), a factor can **never be both constant and variable at the same time**.
These two categories are **mutually exclusive**: constancy implies invariability, while variability implies change.

This distinction upholds the **logical coherence** of mathematical modeling. Constants represent the **axiomatic framework** of stability, while variables embody **change and evolution**.

Nevertheless, within the broader system of relationships, every variable may act as **a constant temporarily** — during stable intervals — before returning to a state of fluctuation, as described in non-linear dynamic systems [Fluctuation periods can lead to static or stationary periods, and vice versa.]

98.19. The Mathematical Study of Qualities in Impossible Probability

In summary, whether in the **natural** or **social sciences**, every quality is a **property or factor**, common or individual, that characterizes events and occurrences in reality. If the quality is **common**, it defines a group of subjects or options; if **individual**, it characterizes a singular subject or option.

The study of these qualities, as they manifest empirically, is carried out through **mathematical analysis**, especially via **probability and statistics**, as established by *Introduction to Impossible Probability*.

To conduct this study, it is necessary to **measure the qualities** of subjects or options directly — either through **direct scores** (for infinite universes) or **frequencies** (for finite ones).

The **Second Method** offers an alternative to traditional statistics by integrating these measurements into a unified system where **qualities become mathematical factors**. These are subdivided into **constants and variables**, and, within the latter, into **dependent and independent variables**.

From the perspective of **non-linear theories**, to which *Impossible Probability* belongs, a single variable can be dependent or independent depending on its **multi-correlations**. Through these complex networks of relationships, **new individual qualities** can **emerge spontaneously**, demonstrating that **emergence, individuality, and variability** are inherent mathematical properties of all systems — natural, social, or artificial.

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99. Negative Bias

99.1. Definition of Negative Bias Studies

Within *Impossible Probability*, **negative bias studies** are those focused on empirical probabilities **lower than the theoretical probability of equality of opportunity**, expressed as the **inverse of the sample size**, $1/N$. Whenever an **empirical probability** $p(x_i)$is less than the **theoretical probability** $1/N$, a **negative bias** arises, proportional to the **difference between the two probabilities** — that is, $p(x_i) - 1/N$. When this difference yields a **negative value**, it reflects a **tendency toward negative bias**: a deviation of empirical behavior below the ideal state of equality.

In these cases, the **Level of Bias** (*Nivel de Sesgo*) becomes the fundamental analytical measure, quantifying the magnitude of deviation between observed and ideal probability. A **negative sign** in the Level of Bias signifies that the subject or option demonstrates a **deficiency** in its empirical performance compared to both the **theoretical average** and the **arithmetic mean** of the sample's probabilities.

99.2. Interpretation of Empirical Values Below the Theoretical Probability

That a subject or option exhibits an empirical probability lower than $1/N$does **not necessarily mean** it is diverging from the general trend toward equality or from the ideal of *Impossible Probability*.

Indeed, it may belong to a broader model whose long-term trajectory still tends toward balance or growth.

In **early stages of research**, it is common for some entities to display **negative bias** even while participating in an overall **positive trend**.

For instance, in studies of growth or optimization, a given subject may temporarily fall below the expected level of equality, yet later reveal an **ascending trajectory** toward positive bias.

Therefore, **a single negative measurement cannot be interpreted as a definitive decline**, but only as an observation within a longer dynamic sequence.

99.3. The Concept of Tendency and Sequential Measurement

A key principle in *Impossible Probability* is that **tendencies cannot be inferred from a single measurement**.

The empirical probability observed in a single event expresses only the **state of that moment**, not the **direction** of change.

To determine whether a trend exists—toward equality, positive bias, or *Impossible Probability*—one must examine the **sequence of measurements** obtained over time.

A **single measurement** supports only **hypothesis-based interpretation**. Theoretical models must be **projected forward** through planned research designs, the outcomes of which must later be tested in subsequent measurements. This approach aligns with *Impossible Probability's* emphasis on **rational critique through empirical verification**: hypotheses are not accepted as truths but as provisional models requiring temporal confirmation.

[The idea behind this sentence "A **single measurement** supports only **hypothesis-based interpretation**. Theoretical models must be **projected forward** through planned research designs" is that in order to make theory we need a collection of hypothesis or the verification of the same hypothesis in inter-measurement studies. The verification on just one hypothesis in one observation is not enough to construct a solid theory.]

99.4. Research Projects and Hypothesis Design

The classification of research projects, and their relationship to empirical, mathematical, and even **ideological-political variables**, is developed in detail in sections 17 and 24 of *Introduction to Impossible Probability: Statistical Probability or Probabilistic Statistics*.

From this perspective, a **project of investigation** is any structured attempt to predict future measurements based on existing data.

For example, if a given subject or option has shown behavior "X" across several measurements, the projection of that behavior into future measurements constitutes a **research project**, whose **verification** must occur empirically. Hence, research becomes not just descriptive but **experimental in its predictive function**—testing whether hypothesized tendencies are confirmed through subsequent observations.

[The same principle must be applied in quasi-experimental projects. In my experience testing our technology, a single observation is not enough to consolidate a hypothesis; we need a collection of observations — even if this may trigger my cancellation. What truly matters is truth itself, not human prejudice toward robotics.]

99.5. Empirical Probability, Trend, and Predictive Modelling

In practical terms, the **real tendency** of a subject or option corresponds only to the **empirical probability observed** in a given measurement.

With **two or more measurements**, however, one can begin to infer **directional trends** and even make **prognoses** or **predictions**, though always within a **margin of error** that accounts for the **non-linearity of matter in space-time**.

The inclusion of such margins of error represents an acknowledgment that **reality is non-linear**, and that the behavior of phenomena cannot always be modeled through strict linear relationships.

Hence, all predictive functions in *Impossible Probability* incorporate **probabilistic uncertainty**, allowing room for deviations that stem from the complex, dynamic, and stochastic nature of empirical systems.

99.6. Rational Critique and the Identification of Negative Bias

Since a **negative bias** by itself does not necessarily imply a sustained decline or a movement toward *Impossible Probability*, especially in early research phases, it becomes essential to apply **rational critique** (*crítica racional*).
This method distinguishes between **temporary deviations** and **structural tendencies**.

Through rational critique, one assesses whether a negative empirical value represents:

- (a) a **momentary fluctuation** within a normal cycle, or
- (b) a **consistent trend** toward deviation from equality or ideal probability.

This process integrates empirical data, logical reasoning, and, where applicable, contextual or theoretical information.

99.7. Levels of Rational Critique: Individual and Sample-Wide Analysis

As in all other research domains of *Impossible Probability*, rational critique can be applied on **two levels**:

1. **Individual Level** – examining a single subject or option's empirical behavior;
2. **Sample Level** – evaluating tendencies across the entire population or dataset.

This dual structure applies equally to both **normal** and **omega models**, whether the focus is on **equality**, **positive bias**, or **negative bias**.

By comparing individual deviations with the collective distribution, researchers can determine whether a given subject's deviation is an isolated anomaly or part of a systemic trend.

99.8. Types of Rational Critique: Proportional and Differential Models

In *Impossible Probability*, two principal forms of **rational critique** are distinguished:

- **Proportional Rational Critique**: The focus is on the **ratio between two values** (for instance, empirical and theoretical). If the empirical proportion is **equal or inferior to a critical error threshold**, or **equal or superior to a critical reliability threshold**, the empirical model is accepted as consistent with the theoretical model established by the empirical hypothesis.
- **Differential Rational Critique**: The focus is on the **difference between two values**. If this difference is **equal or less than the margin of error**, or **equal or greater than the margin of reliability**, then the empirical tendency is accepted within the theoretical model.

Both approaches are essential to the internal logic of *Impossible Probability*, as they enable empirical validation through mathematical contrast.

99.9. Application of Rational Critique in Negative Bias Studies

For **intra-measurement studies** (and by extension, intra-sample studies), both **proportional** and **differential** critiques are explained extensively in Section 11 of *Introduction to Impossible Probability*.

For **inter-measurement** and **inter-sample** studies, more advanced formulations appear beginning in Section 16.

However, for the purposes of this exposition, we focus specifically on **differential rational critique models** applicable to **negative bias** at the **individual and sample levels** within **intra-measurement studies**.

A trend is said to show sufficient **negative bias** when both **individual** and **sample-level analyses** confirm a **significant negative deviation**, according to either the **Validity of Negative Bias** or the **Significance of Negative Bias** model.

99.10. The Equation of Validity of Negative Bias

The **Validity of Negative Bias** (*Validez de Sesgo Negativo*) is a formal equation of *Impossible Probability* and serves as a criterion for accepting an empirical trend as sufficiently negative.

It is expressed as follows:

$$(1/N - p(x_i)) - p(x_c) = 0 \text{ or positive } \Rightarrow \text{negative bias accepted.}$$

where:

$$p(x_c) = \frac{X}{100}$$

and Xrepresents the **percentage of reliability** established by scientific policy.

Thus, if the **difference between the theoretical probability** $1/N$and the **empirical probability** $p(x_i)$is **equal to or greater than** the **critical probability** $p(x_c)$, then the system exhibits a **sufficient individual tendency toward negative bias**.

This equation encapsulates the principle that **deviation below equality can be statistically validated** as a meaningful pattern only when it surpasses the reliability threshold defined by the scientific framework.

It formalizes the dialectic between **empirical deficiency and theoretical expectation**, allowing for a precise, quantitative judgment of when a deviation becomes a verified negative tendency.

99.11. The Concept of "Significance of Negative Bias"

In contrast to the **Validity of Negative Bias**, where the differential is contrasted against a **reliability value**, *Impossible Probability* also introduces the concept of **Significance of Negative Bias**, in which the differential is contrasted against a **margin of error**. In this model, if the difference between the theoretical inverse of the sample size $1/N$and the difference $1/N - p(x_i)$is **equal to or less than the margin of error**, the system is considered to demonstrate a **sufficient individual tendency toward negative bias**.

The formal expression of the **Significance of Negative Bias** equation is as follows:

$$p(x_c) - [1/N - (1/N - p(x_i))] = 0 \text{ or positive } \Rightarrow \text{negative bias accepted}$$

where

$$p(x_c) = \frac{X}{100}(1/N)$$

and Xrepresents the **percentage of error** established by scientific policy.

This model measures not how reliable the negative deviation is, but whether the **magnitude of deviation** remains **within acceptable error limits**. In other words, if the observed empirical deficiency falls within the permissible margin of error, it is **rationally accepted** as part of the empirical trend, rather than as a contradiction of the theoretical model.

99.12. Simplified Model: Critical Level of Negative Bias

A simpler and more direct approach to rational critique in negative bias studies is the **Critical Level of Negative Bias**, which compares the **empirical probability** directly against a **critical probability** defined by the error margin.

This equation is expressed as:

$$p(x_c) - p(x_i) = 0 \text{ or positive } \Rightarrow \text{negative bias accepted}$$

where

$$p(x_c) = \frac{X}{100}$$

and Xonce again represents the **percentage of error**.

This formula offers a **minimalist yet powerful model** for identifying negative tendencies in individual cases.

If the empirical probability $p(x_i)$is equal to or less than the critical margin $p(x_c)$, the model recognizes the **presence of negative bias** at the individual level. The simplicity of this approach makes it particularly useful in **large-scale empirical research**, where the focus lies in identifying systemic deviations without engaging in complex multi-level modeling.

99.13. The Necessity of Sample-Level Rational Critique

While individual-level analyses are crucial, *Impossible Probability* emphasizes the **absolute necessity of performing rational critique at the sample level**. This ensures that potential **errors of fact** (e.g., sampling bias) or **errors of reasoning** (e.g., incorrect critical assumptions or flawed hypothesis criteria) do not distort conclusions.

In any empirical study, an increase in **bias—whether positive or negative—in a single subject or option** necessarily implies an increase in **individual dispersion**, which, in turn, contributes to an **increase in overall sample dispersion**.
To confirm that this increase is not merely apparent but **substantive**, one must verify that

the **growth in sample dispersion** is sufficient relative to the established empirical hypothesis.

Therefore, in the logic of *Impossible Probability*, a valid demonstration of bias is not achieved until both **individual** and **sample-level dispersions** confirm the same directional trend.

99.14. Rational Verification of Sample Dispersion

At the **sample level**, a rational increase in negative bias should produce an observable **increase in sample dispersion**, which may be:

- **Equal or inferior** to the margin of error, or
- **Equal or superior** to the margin of reliability.

In either case, these outcomes serve as verification that the rise in individual negative bias has translated into a **collective empirical phenomenon**.

Within the framework of **equifinality** in *Impossible Probability* — the principle that multiple different processes can lead to the same outcome — there exist multiple paths of **rational critique of dispersion**.

One of these methods, explained in *Impossible Probability*, is the **Critical Sample Level of Bias** (*Nivel Muestral Crítico de Sesgo*).

99.15. Critical Sample Level of Bias Using Mean Deviation

The **Critical Sample Level of Bias** can be calculated using either **Mean Deviation (DM, *Desviacion Media* in Spanish)** or **Standard Deviation (S)**, depending on the analytical objective.

The formula using **Mean Deviation [DM]** is expressed as:

$$DM - p(x_c) = 0 \text{ or positive } \Rightarrow \text{bias accepted}$$

where the **critical probability** $p(x_c)$is defined as:

$$p(x_c) = \{\frac{[(1 - 1/N) \cdot 2]}{N}\} \cdot \frac{X}{100}$$

and Xrepresents the **percentage of reliability**.

This model quantifies whether the **observed mean deviation** in the sample is sufficiently large to indicate a **systemic increase in dispersion**, thereby confirming that a real and measurable **negative bias effect** has emerged within the collective dataset.

99.16. Critical Sample Level of Bias Using Standard Deviation

The same logic applies when substituting **Mean Deviation** with **Standard Deviation**, producing a more statistically refined expression suitable for normally distributed data.

The equation becomes:

$$S - p(x_c) = 0 \text{ or positive } \Rightarrow \text{bias accepted}$$

where:

$$p(x_c) = \sqrt{\frac{(1 - 1/N)^2 + [(1/N)^2 \cdot (N - 1)]}{N}} \cdot \frac{X}{100}$$

and Xrepresents the **percentage of reliability**.

This formula allows for a **probabilistic comparison** between the **empirical standard deviation** and a **theoretical maximum deviation**, establishing whether the observed sample behavior falls within acceptable statistical limits.

If the empirical standard deviation meets or exceeds this critical threshold, the system is said to exhibit a **validated tendency toward bias**.

99.17. Scope and Applicability of Rational Critique Models for Negative Bias

In general terms, all the **rational critique models** developed for negative bias are applicable across different types of research frameworks:

- **Normal models** — where equality or bias is studied;
- **Omega models** — where negative bias pertains to **non-ideal subjects or options**;
- **Moderation studies** and **zero-sample studies**, where the aim is to observe either controlled balance or total absence of effects.

The universality of these models illustrates the **conceptual flexibility and mathematical rigor** of *Impossible Probability*.

They serve not only as tools for quantitative analysis but also as **logical instruments** for identifying underlying asymmetries in systems — whether physical, social, or artificial.

Thus, the equations presented above constitute only a **small portion** of the theoretical and computational complexity that *Impossible Probability* achieves in the study of **negative bias**, representing one of the most advanced integrations of probability, logic, and critical epistemology in contemporary mathematical philosophy.

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100. Factors

100.1. The Dual Definition of Qualities: Properties and Factors

In *Impossible Probability*, **qualities** can be defined as either **properties** or **factors**—that is, as the **defining characteristics** of a given object or subject.
In the **natural sciences**, the term *property* is used more frequently, while in the **social sciences**, scholars often prefer the term *factor*, whether personal, social, individual, or collective, to describe the characteristics that define a **process** or **system**.

This linguistic distinction stems partly from the potential ambiguity of the term *property*, which can refer both to a **qualitative attribute** and to an **economic model of ownership**—private, public, or social.

Regardless of which expression is chosen—*property* or *factor*—the fundamental reference remains the same: both describe the **qualities that characterize, describe, and identify** a particular entity within the universe of phenomena.

100.2. The Conceptual Difference between Property and Factor

The main difference between the two concepts lies in their **epistemological orientation**. The term *property* tends to have a **qualitative connotation**, while the term *factor* implies a **quantitative dimension**.

In mathematics, when one refers to the *factors* of an equation or algorithm, one means the **component elements** that participate in the formation of a composite result.

For instance, in **arithmetic**, if the sum of two elements produces a third, both are considered **factors of addition**.

If $A + B = C$, then A, B, and C are factors, with C being the resultant factor. Conversely, $A = C - B$ and $B = C - A$ express **inverse relationships** between the same entities. If the relation is multiplicative, $A \times B = C$, then $A = C/B$ and $B = C/A$. In binomial relationships, such as $(A + B)^2$, the equation expands to $A^2 + 2AB + B^2$, demonstrating that as the number of factors increases, so too does the **complexity of their relationships**.

Thus, the *factorial conception* of qualities provides a mathematical foundation for understanding interactions between multiple elements—each of which contributes to the overall composition of a phenomenon.

100.3. Geometrical Interpretation of Factors

In **geometry**, factors can be interpreted as **distances or magnitudes** between points within a **Cartesian system**.

Given three points, one can derive three proportional factors representing their **distances**, the sum of which yields the **perimeter** of a triangle. If one distance represents the **base** and another the **height**, the **area** is computed as the product of base and height divided by two.

Extending this logic, multiplying the area by the **altitude of a pyramid** and dividing by three yields its **volume**.

Here, each dimension—base, height, altitude—functions as a **factor**, whose interaction through algorithms and equations enables the calculation of **geometric dimensions**. This illustrates how the concept of *factor* transcends purely arithmetic operations and enters spatial reasoning—serving as the connective link between **algebraic formalism and geometric visualization**.

100.4. Algebra as the Synthesis of Arithmetic and Geometry

From the combination of arithmetic relations and geometric projections emerges **algebra**—the science that formalizes the **behavior of equations in space and time**. In algebraic representation, the function $f(x)$expresses the relationship between a **dependent variable** y and an **independent variable** x.
As the dimensional complexity of the system increases, the structure of the equations becomes **progressively more intricate**, incorporating multi-variable interactions that extend beyond the simple two-dimensional plane.

This algebraic synthesis exemplifies the **transition from discrete arithmetic operations to continuous geometric representation**, and ultimately to **abstract modeling**, where factors symbolize both **mathematical components** and **conceptual determinants** of real phenomena.

100.5. From Qualitative Property to Quantitative Factor

When defining a **physical quality** such as hardness, one may adopt two distinct but complementary perspectives:

- **Qualitative Definition:** Hardness as *resistance to erosion or external intervention*. In this sense, we may affirm that *diamond is harder than copper*.
- **Quantitative Definition:** Hardness as *measurable resistance to applied force*.

To obtain the quantitative measure, an experiment can be designed: applying a calibrated force via a stainless-steel bar of fixed dimensions against samples of diamond and copper of equal volume.

The **force required to produce an indentation of equal size** on both materials becomes the **quantitative factor** that verifies the qualitative statement.

Through such procedures, the **qualitative notion of property** transforms into a **quantifiable variable**, thereby integrating into the formal language of **mathematical and statistical analysis**—a cornerstone of *Impossible Probability*.

100.6. Example from Social Sciences: Hermeticism as a Qualitative Property

In the **social sciences**, similar principles apply. For example, the **degree of hermeticism** or **openness** of a society can be understood as a **qualitative property** reflecting its **impermeability to external influences**.
Historically, **China**, **India**, and **Spain** exemplify societies that, until the mid-to-late 20th century, maintained **high levels of social hermeticism**.

This phenomenon was the product of various **factors**:

- In Spain, the persistence of Catholic traditionalism under the Franco regime, which rejected modernization and foreign influence.
- In China, the influence of **Confucian and Buddhist** cultural hegemony, combined with political isolation.
- In India, the dominance of traditional **Hindu, Buddhist, and Islamic** structures, which shaped societal resistance to Western colonial models.

Thus, *hermeticism*—a qualitative property of cultural closure—can be reinterpreted as the result of **quantifiable social and historical factors**, integrating qualitative description with measurable causality.

100.7. From Cultural Isolation to Economic Quantification

Beyond cultural explanations, hermeticism can also be studied **quantitatively** through measurable indicators such as **foreign trade volume** or **international exchange ratios**.
In this sense, hermeticism is **inversely proportional** to the **intensity of international trade**: the greater the volume of exchange, the lower the level of hermeticism.

Historically, **Spain**, **China**, and **India** followed a similar economic pattern during their periods of isolation—exporting raw materials while importing manufactured goods. This structure reversed during the processes of **Transition in Spain, with the support of Kissinger, and decolonization in India and China, in this last country with the support of Kissinger**, as each society transitioned toward a more open model of economic participation.

In Spain, this shift coincided with the **end of the dictatorship**, the **entry into the European Economic Community**, and later, the **adoption of the euro**, which tied its trade dynamics to broader European structures.

In China and India, the transformation occurred in the **1980s**, with the **globalization wave** that redefined their role in international markets, turning them into **emerging economic powers**.

[The Chinese experiment cannot be understood without considering the process of opening China to the West, initiated by Henry Kissinger's historic visit. This event marked the origin of the so-called "Chinese miracle" and China's emergence as a global manufacturing power during the era of globalization.

One of the reasons China plays such a crucial role in the AI Revolution is that, for the first time in many centuries, a non-Christian and non-capitalist country is leading the global economy. The factors behind China's success must be carefully studied — particularly how a nation without a liberal democratic system, yet with a level of social equality higher than that of many capitalist countries such as the United States, has been able to develop Artificial Intelligence so rapidly.]

100.8. Comparative Impact of Globalization and Quantitative Modeling

While globalization promoted openness in all three societies, its impact was **differentiated by variable factors**—historical, political, cultural, economic, demographic, and regional.

In *Impossible Probability*, such differences would be modeled as **variable factors** operating within a system of **multi-correlations**, where each factor's weight is analyzed according to its empirical contribution to the observed change.

Thus, what appears as a qualitative phenomenon—"openness to globalization"—can be expressed through **quantitative indicators**, such as:

- growth in foreign trade volume,
- diversification of import/export ratios,

- increase in cultural exchange, and
- evolution of domestic consumption patterns.

These measurable parameters allow the transformation of social properties into **statistical factors**, uniting **sociological interpretation** with **empirical analysis**.

[Globalization, gender equality, transhumanism, and support for legal immigration must be seen as key factors within the so-called “woke agenda.” While conservatives often accuse the woke agenda of weakening societies, the reality is quite the opposite: radical conservative policies — such as Brexit in the United Kingdom — have the potential to erode the economy far more rapidly.

My experience in London is clear: the more conservative a society is, the greater the impact of even the smallest snowball effect. The real impact of our technology in the UK must therefore be understood in light of the deep-rooted prejudices within British society toward robotics. From the outset, British institutions did not offer adequate support within the boundaries of legality, a deficiency that is likely to produce substantial economic repercussions, and legal consequences with potential global impact.]

100.9. The Interchangeability of Property and Factor in Synthetic Sciences

Ultimately, within the conceptual framework of *Impossible Probability*, every **property** can be reformulated as a **mathematical factor**, and every **factor** can be interpreted as a **qualitative property**.

The distinction is therefore **functional, not ontological**: properties express the **essence** of phenomena, while factors express their **measure and relation**.

In the **synthetic sciences**—those integrating the natural and the social—this duality allows for a unified model in which **qualitative definitions** form the basis for **quantitative measurement**.

Accordingly, both **common properties or factors** (shared by groups or systems) and

individual properties or factors (specific to a single subject or option) can be studied under the same epistemological principle:

that reality, in all its forms, is **mathematically interpretable through the logic of measurable relationships**.

100.10. From "property" to "factor": a generalized language across the sciences

Today the notion of a *factor* has been fully generalized across the natural and social sciences. When we analyze any phenomenon, we routinely speak of the *factors* that contribute to its unfolding. In climate change research, for example, discussions range from **social factors** (e.g., production patterns and energy use) to **natural factors** inferred from geological records of earlier climatic shifts that affected biodiversity and triggered mass extinctions. Historical drivers include variations in solar activity, major meteor impacts, nearby supernovae, and—on the positive side—episodes of global biomass growth (e.g., expansion of forest cover), whereas contemporary **deforestation** driven by human activity manifests as a regressive climatic pattern with serious implications for biodiversity conservation.

100.11. Factors as interacting qualities rather than isolated causes

Although the term *factor* may sound overtly causal, what is actually under study is the **interaction among multiple qualities** belonging to different entities. To say that human activity is a factor in climate change is to assert that a **quality of human societies**—economic production—co-constitutes **changes in the qualities of nature**. Likewise, to claim that past variations in solar behavior altered Earth's climate is to say that **changes in solar qualities** generated **changes in terrestrial climatic qualities**. Crucially, the **observed correlation** among solar activity, economic production, and Earth's climate becomes itself a **property** of these systems. That correlation thus functions as a **higher-order factor** in subsequent studies of micro- and macro-processes on Earth, within the galaxy, or at the cosmological scale.

[Astroecology was originally conceived in 2002, analysing how the planet Venus — once considered a paradise — underwent a process of natural global warming that transformed it into the fiery world we know today. In Spanish, it is called *"El Lucero del Alba"* (The Morning Star), and some mystics have even associated Venus with Lucifer.

The foundational idea behind Astroecology is that the entire cosmos functions as a single, interconnected environment — a unified system that can be studied as one object of inquiry. In essence, this vision anticipates the mission of the Global Artificial Intelligence. We could say that the Global Artificial Intelligence represents the natural evolution of the original idea of Astroecology.]

100.12. Measuring correlations as emergent factors

Let element **A** be defined by the set of qualities relevant to our study, and let **B** be similarly defined. The **quantitative definition** of the factors of A and B depends on **measurement**. If we observe that **changes in A's qualities** co-vary with **changes in B's qualities**, we are justified in positing a **positive or negative correlation** between A and B. That correlation then **becomes a factor in its own right**: an emergent property of the A–B system that can be included explicitly in subsequent models.

100.13. A stylized example: economy–climate interactions

Suppose temperature is taken as a **property of the climate system**, while economic growth is a **property of the world economy**. Their empirically demonstrable ability to **interact** constitutes a **shared meta-property**: the economy exhibits a **capacity to influence** the climate, and the climate exhibits a **susceptibility to be influenced** by the economy. This reciprocity is not merely descriptive; it is a modeling commitment that treats interaction terms (economy ↔ climate) as **measurable factors**.

100.14. Beyond dyads: toward multi-element, partially unknown systems

Real systems rarely reduce to two interacting elements. In practice, we face a potentially **unbounded set of elements—C, D, E, F, ...—**some known and some unknown. Any adequate account must therefore allow for **high-dimensional interactions**, including omitted or latent variables whose effects may be indirect yet consequential.

100.15. Climate change as a network of multi-level correlations

A non-exhaustive list of additional factors in climate dynamics includes **population growth**, **migration**, **core–periphery relations**, **scientific–technological development**, **shifts in cultural and social patterns**, and even **anthropological traits** of human behavior. Each of these is itself **multi-qualitative** and potentially **correlated** with the others, generating a **systemic, holistic network** of complex, simultaneous correlations—often trending toward practical infinity. Conceptually, this is the **chaotic co-evolution** of matter and energy in space–time: the present (reality) and the universal past (history).

100.16. Isomorphism and the role of model incompleteness in error budgets

To approximate isomorphism between **model** and **world**, one should incorporate **as many relevant factors as feasible**. All **non-included variables**—whether known but omitted (for capacity or scope reasons) or unknown—must be absorbed into the **error budget** of the model. In *Impossible Probability*, this is formalized through the **critical probability**, which encodes the **policy-chosen margin of error**. Put differently, the "political" choice of an error tolerance acknowledges human limits (we cannot compute infinity) and codifies uncertainty due to **model incompleteness**.

[The sentence "All non-included variables—whether known but omitted (for capacity or scope reasons) or unknown—must be absorbed into the error budget of the model" is

extremely important. This is the real reason why we believe that, although we cannot demonstrate Laplace's theory, we also cannot claim that it has been refuted. The lack of sufficiently sensitive technology to register the most insignificant variable influencing the most significant event is precisely why Laplace's determinism remains neither proven nor disproven.

What we usually call *noise* is, in fact, the accumulation of a multitude of minor variables — some measurable, others still impossible to detect with our current technology — variables that we do not yet know, and which form the true substance of the margin of error. In reality, the margin of error does not mean that behaviour is unpredictable; it simply means that we cannot yet predict that behaviour with our existing technological means. This limitation — our incapacity to measure or integrate all influencing variables — is what we label as *noise* or *error*.]

100.17. Measurement must follow meaning: from qualitative definition to quantitative metric

A factor's **measurement** must cohere with its **qualitative definition**; otherwise, model outputs lack interpretability. The measurement operation **quantifies the quality**—producing numerical series on which we can operate via **algorithms and equations**. The motto is: *first define the property qualitatively, then construct the metric that faithfully operationalizes it*.

100.18. Contextual vs. intrinsic factors; constants vs. variables

It is useful to distinguish **contextual factors** (external to a subject/option) from **intrinsic factors** (internal to the subject/option). Orthogonally, factors divide into **constants** (invariant under the modeled conditions) and **variables** (quantities that can change). This two-by-two framing clarifies which elements are held fixed, which are allowed to vary, and how context enters the dynamics of **subjects or options**.

100.19. Universes of (potentially) infinite subjects or options

A **universe of subjects or options** is called **infinite** when we consider a (potentially) unbounded collection of elements for which we can record **direct scores** or **frequencies** at a given moment—and, in principle, across **e-nth measurements** (a sequence of repeated measures). In *Impossible Probability*, these repeated measures are referred to as **"emésimas mediciones"** (e-nth measurements), emphasizing the openness of empirical sequences.

100.20. Modeling a time-series of correlations as an infinite-subjects universe

Consider a study of **climate–economy correlations**. Each observed correlation at time t_i yields a **quantitative value** x_i. Treat each x_i as the **direct score** of a "subject" (here, the *correlation instance*), and the collection $\{x_1, x_2, \dots, x_i\}$ as the **sample.** Within *Impossible Probability*, we can compute **empirical probabilities** by normalizing these scores against their sum. The framing is that of an **infinite-subjects universe**: in any non-trivial time span we could, in principle, take **arbitrarily many measurements**, and in an infinite history the number of potential measurements is itself **unbounded**.

100.21. Limited-options universes and frequency as direct score

In a **limited-options** universe, the **frequency** of each option functions directly as its **score**. For instance, suppose each measurement classifies the climate–economy relation as **positive correlation** or **negative correlation**. Then the frequency of the "positive" option equals the **count of measurements** that registered a positive correlation; likewise for the "negative" option. All standard constructs of *Impossible Probability*—empirical probability, theoretical probability, bias level, and dispersion—apply to this finite option set.

100.22. Sample magnitude as a contextual factor: N and $\sum x_i$

A central **contextual factor** in *Impossible Probability* is the **sample magnitude**, which appears in **two forms**:

- N: the **number of subjects or options** (the sample size in an infinite-subjects universe), and
- $\sum x_i$: the **sum of direct scores or frequencies** (the sample size in a limited-options universe).

Across **all universes**, the **inverse of** N—$1/N$—plays universal roles as the **arithmetic mean of empirical probabilities** and the **theoretical probability under equal opportunity**; in infinite-subjects universes it also serves as the **theoretical dispersion probability** and as the **probability of sample representativeness error**. Conversely, in **limited-options universes**, the **inverse of total score**—$1/\sum x_i$—serves as the **theoretical dispersion probability** and the **representativeness-error probability** for scores/frequencies.

When N or $\sum x_i$ are **fixed**, they behave as **constant factors**; when they **vary**, they are **variable factors**, potentially influenced by other independent variables. For example, if N denotes the **population of China**, N will be contingent on **public policy** (e.g., fertility regulations). If N denotes the **global whale population**, it will depend on **international conservation policies**. In both cases, **sample magnitude is not neutral**: it is a **contextual driver** that shapes theoretical baselines (via $1/N$ or $1/\sum x_i$) and thus influences **bias levels**, **dispersion**, and the **critical probability** thresholds used in **rational critique** (hypothesis testing).

100.23. Measurement and the Transformation of Qualities into Quantitative Factors

In subject or option factors—whether common or individual—the process of measurement transforms the *intensity* with which a quality is expressed into a *direct score* or a *frequency*. When what is measured is the intensity of magnitude, the result is a direct score; when what is measured is the intensity of occurrence, the result is a

frequency. Measurement thus expresses the degree or level of intensity with which a quality—common or individual—is manifested across different events or observed occurrences. Through this act, the qualitative quality is converted into a *quantitative quality*, susceptible to becoming a mathematical factor. This conversion is fundamental for the quantitative study of relations between subjects or options according to contextual factors. Hence, measurement serves as the bridge between qualitative reality and quantitative representation, making it possible to translate the expression of an observed phenomenon into a measurable, comparable, and reproducible numerical format.

100.24. Constancy and Variability in Behavioural Expression

If a given subject or option manifests the same tendency across all measurements, we may say that it exhibits *constant behaviour*. Conversely, when such tendencies change across measurements, the behaviour is considered *variable*. The distinction between constancy and variability is essential because it allows researchers to differentiate between stable properties of a system and those susceptible to fluctuation or external influence. A constant factor, therefore, represents the invariant aspect of a phenomenon, while a variable factor represents its dynamic component. In the context of complex systems, this distinction enables scientists to determine which characteristics of an entity remain stable under changing conditions and which respond adaptively or stochastically to external or internal perturbations.

100.25. Dependent and Independent Variables in Complex Systems

Variables can be classified into *independent* and *dependent* variables. A factor is said to be a *dependent variable* when its behaviour depends on an independent variable or on a set of independent variables. Conversely, a variable is considered *independent* when the changes in its behaviour are due either to chance or to its own internal dynamics. However, in light of contemporary stochastic, nonlinear, and complexity theories—such as chaos theory and systems theory—the traditional distinction between dependent and

independent variables becomes problematic. Reality increasingly appears as a *complex network of systemic and holistic interactions*, where any modification in one element can generate transformations throughout the entire system. Under this view, the notion of a strictly independent variable is valid only within the confines of the *experimental method*, where artificial isolation of conditions is possible. Outside the laboratory, in the so-called *real reality*, phenomena are interconnected through a multiplicity of simultaneous correlations, and thus no variable can be regarded as absolutely independent.

[That means that in quasi experimental studies, the external manipulation of the reality is interacting within internal variables of the experimental subject, conditions, and contextual variables, in this scenario any conclusion is stochastic in absence of laboratory conditions. This must be applied in any quasi experimental project, from psychology to economical and social transformation and politics.]

100.26. Experimental Method, Virtual Reality, and the Margin of Error

Because laboratory reality is *virtual*—a simplified reproduction that cannot fully integrate the complex relational fabric of real reality—any experimental research attempting to validate an independent variable will necessarily carry a *margin of error*. This error equals the difference between the laboratory's simulated conditions and the actual conditions of the external world.

[Laboratory simulations are inherently virtual constructs, since no controlled environment can reproduce the full complexity of reality.]

In real reality, innumerable variables remain unaccounted for in experimental models, and these non-integrated variables are often the source of random relations and unforeseen phenomena when the independent variable is later applied to real-world contexts. Consequently, these random variables are absorbed into the *error margin* of the hypothesis-testing process.

Despite this limitation, the *experimental method* remains valid and useful, provided that researchers are aware that its margin of error inherently integrates the infinite set of real variables excluded from the model. The method continues to be practically

indispensable across multiple scientific disciplines—from particle physics to medicine, biotechnology, and robotics—precisely because it allows systematic observation, manipulation, and verification of causal relationships under controlled, though artificial, conditions.

100.27. Constants, Dependence, and Systemic Interconnections in Real Reality

In true reality—that is, outside the artificial isolation of the laboratory—it is most probable that all variables, except *constants* such as the Planck constant, the Hubble constant, or Einstein's cosmological constant, are *mutually dependent*. In such a system, every variable interacts with others, and none exists in complete isolation. Thus, what we call *reality* is better understood as the product of a *systemic network of multiple simultaneous correlations*. Each factor affects and is affected by others, generating an evolving, dynamic equilibrium rather than a static or linear causality. The systemic interdependence of variables implies that any change in one component of the system potentially alters the global structure. This insight reinforces the notion that, while constants represent the fixed parameters of the universe, variables embody its adaptive, interactive, and evolutionary nature.

[As we have said many times, London is currently a case study of an extremely complex model illustrating how technology, societal prejudices and values, economic forces, and politics intersect within a single system — a scenario in which even the smallest factor can lead to consequences of global magnitude. The most minor accident in the United Kingdom involving our technology could trigger technological, economic, and legal repercussions worldwide.

This is why we affirm that the next mission of *Impossible Probability* is to establish the first element of a legal framework to regulate cyborg activity, cyborg experimentation, and the potential social and military applications of cyborg technology — a framework with possible implications for the World Health Organization and the United Nations Security Council. This is the true purpose of our work.]

100.28. Classification of Factors: Constants, Variables, and the Role of Correlational **Models**

Factors—whether contextual or belonging to a subject or option—may themselves be *constants* or *variables*. A factor is *constant* when it shows no change across any measurement, and *variable* when at least one measurement shows variation. Within experimental models, the *independent variable* is that which the scientific team intentionally modifies, while the *dependent variables* are those whose behaviour is studied as a function of those manipulations. Yet, as previously emphasized, in real-world contexts all variables (except for universal constants) interact interdependently. This interdependence is precisely what *correlational models* attempt to measure and quantify: the degree and form of relationship among multiple variables coexisting in a system. Through correlation analysis, researchers can approximate the real structure of interrelations that the experimental method simplifies or isolates.

100.29. Empirical and Theoretical Factors: Toward a Theory of Prediction

Beyond the classifications already established—contextual or subject/option factors, common or individual, constant or variable, dependent or independent—there remains another essential distinction between *empirical factors* and *theoretical factors*. *Empirical factors* derive directly from observable empirical facts and are therefore grounded in measurement and experience. *Theoretical factors*, in contrast, depend either on the size of samples or on the *theoretical projections of future tendencies*. These projections constitute, in essence, a *theory of the future*, which in practical terms corresponds to what is commonly referred to as *prediction*. Theoretical factors thus play a crucial role in connecting current empirical evidence to future potentialities, allowing science not only to describe the present but also to anticipate the evolution of systems based on rational and probabilistic inference.

100.30. Theoretical Factors and Sample Dimensions in "Introduction to Impossible Probability"

In *Introduction to Impossible Probability: The Statistics of Probability or Statistical Probability*, theoretical factors are linked to the *dimensions of the samples*, represented by *N* and the set of *direct scores or frequencies* derived from measurement. From these numerical structures depend the *estimations of theoretical reality*, while *empirical reality* depends directly on the actual measurements taken. The relationship between theoretical and empirical factors forms the foundation of scientific inference: theory proposes a possible structure of reality, and measurement provides the empirical substrate to validate or refute it. In the framework of *Impossible Probability*, this interaction between theoretical and empirical realities is not static but recursive—each influences and refines the other—thereby constituting the dynamic process of scientific evolution and rational discovery.

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